FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1930

Jan. 22 .... **"The Strategical Mobility of Air Forces," Lecture, by Gp.-Capt. C. L. Courtney, before Royal United Service Inst.**

Mar. 5 .... **"Air Co-Operation with Mechanised Forces," Lecture, by Wing-Com. T. L. Leigh-Mallory, before Royal United Service Inst.**

June 28 .... **Royal Air Force Display, Hendon.**

Sept. 6–28 .... **Aero Exhibition, Stockholm, Sweden.**

EDITORIAL COMMENT

THERE appears to be almost an epidemic of large aircraft at the present time. Last week we referred in these columns to certain tare and gross weight figures which had become available concerning the Do.X flying-boat, and compared these figures with those of four typical British marine aircraft of much smaller size. We have since received from America particulars of the giant monoplane which the General Development Company of Connecticut is having designed, and of which four are to be put in hand immediately. Dr. Christmas is the moving spirit in the new undertaking, and is stated to have the backing of a powerful financial group. The data supplied to us, and the drawings accompanying them (published in this issue), show a machine of well-nigh fantastic proportions: Length 138 ft., span 262 ft., wing area 10,370 sq. ft., tare weight 90,000 lbs., gross weight 145,000 lbs. The machine is a twin-fuselage tractor cantilever monoplane, and is to be of all-metal construction, except for the covering, which is to be of ply-wood. The arrangement of the power plant is unusual in that in the nose of each fuselage are mounted four separate engines of more than 1,000 h.p. each, disposed symmetrically around the propeller shaft and driving through clutches and reduction gears.

Ambition

Superficially, there is nothing in the new design to give one cause to doubt the feasibility of the scheme, but if one comes to examine the data in detail, and compares them with existing aircraft of which the data are known and can be verified, the *estimated* figures of the Christmas monoplane give one furiously to think.

In reviewing somewhat critically the figures relating to the Do.X, last week, we arrived at the conclusion that the price which Dr. Dornier has had to pay for *size*, even accepting the practical possibility of using very high wing and power loadings, was a reduction in disposable load of from 12 to 8 lbs. per h.p. And this machine is a flying-boat, a type in which it is

fairly generally held that the limit in useful size is not reached as early as in a landplane.

The Christmas monoplane is a landplane, and yet the estimated figures show a ratio of gross weight to tare weight of 1·61, or about the same as a number of British flying-boats with a gross weight of round about 20,000 lbs., or something like one-seventh of the estimated gross weight of the Christmas monoplane. In the case of the Do.X one arrives at the conclusion that it was made possible only by using very high wing and power loadings. Yet the Christmas monoplane shows quite normal figures: wing loading 14 lbs./sq. ft., and power loading 16·5 lbs./h.p. A ratio of gross to tare weight of 1·61, coupled with such normal loadings, would represent one of the greatest achievements in aeronautical structural engineering, and one rather feels that there must be a serious "snag" somewhere.

But little information is available concerning the details of the structure, beyond the fact that it is to be mainly of steel. Even granting that the very size of the Christmas monoplane will doubtless enable a number of detail refinements to be made which would not be practicable in a smaller machine, it is difficult to believe that a percentage structure weight of the same order as that obtained in quite small machines could be obtained. If it can, then it indicates that Dr. Christmas's engineers are far more clever than British and German aeronautical engineers.

Following the comparison made in last week's issue, the disposable load carried per horse-power in the Christmas monoplane is 6·25, or almost exactly the same as that of the Supermarine "Southampton" flying-boat, a machine with a gross weight of but 14,600 lbs., or about one-tenth the weight of the American machine.

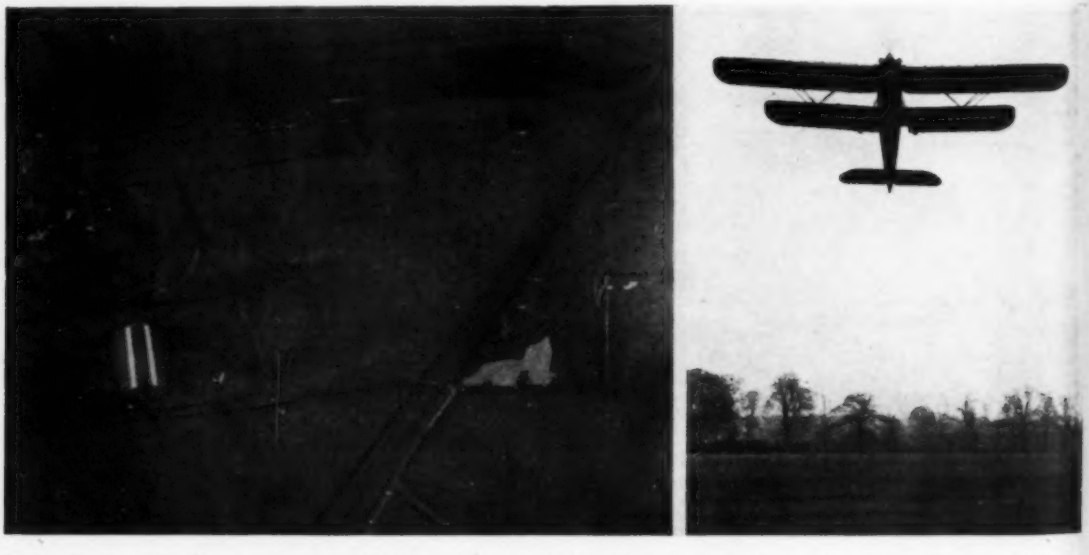
An examination of the three-view general arrangement drawings shows that in designing the Christmas monoplane the engineers have doubtless been able to save quite a good deal of weight by distributing the disposable load over a considerable proportion of the wings. And the twin-fuselage arrangement may also help a good deal, especially in reducing some of the stresses due to the concentrated loads from a land undercarriage. But making every allowance for all these possibilities, one is still left wondering.

❖ ❖ ❖

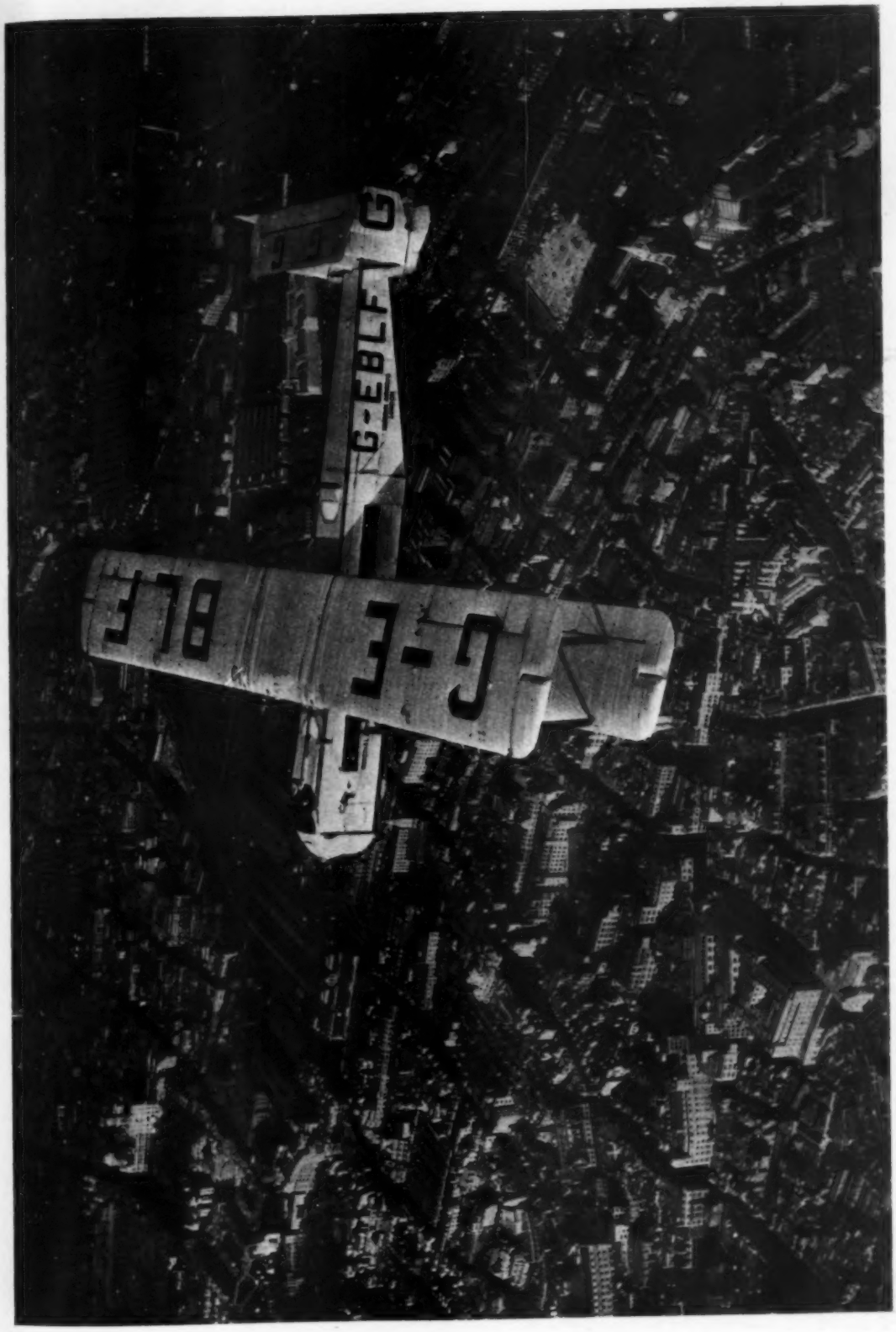
Commercial Aviation

For a number of years almost the only form of civil aviation which could truly be called "commercial aviation" has been air survey and air photographic survey. At least this has been, and is at the present day, true of Great Britain. Working without any Government subsidy, and yet managing to carry on and to make the work pay, our two commercial undertakings, the Aircraft Operating Company and the Air Survey Company, have done extremely valuable work, and have laid foundations for the future which are now beginning to justify by very promising results the solidity upon which they have been built. The value of unsubsidised air survey is, to our way of thinking, twofold: it is aviation which pays its way and thus provides work for a number of people, and the work done is of very real value to the community. We fear that in the case of a good many air routes the return for the money spent is not of any very great value to the nation. The effects of air surveys, direct and indirect, are, however, far-reaching and may well produce results, one way and another, of a value out of all proportion to the money spent.

It is, therefore, with very great satisfaction that we learn of the very large contract which the Aircraft Operating Company has secured, for a survey of no less than 63,000 square miles of territory in Northern Rhodesia, not to mention more detailed air surveys of half a dozen townships. Maj. Hemming and Mr. Alan Butler have done much pioneer work in this particular sphere, and the new contract will be facilitated considerably by the fact that a machine specially designed and built for the work is to be used. This is the Gloster Air Survey machine, fitted with two Bristol "Jupiter" engines, in which facilities never hitherto provided have been incorporated. We wish the undertaking every success.



H.P.: On the left, the new Handley Page aerodrome at Radett in course of construction. On the right, a "Hare"-raising take-off by a new Handley Page Day Bomber. (FLIGHT *Photos.*)



AFTERNOON TEA ABOVE LONDON: An Imperial Airways "Argosy" airliner on the "Silver Wings" service flying over London. Liverpool St. and Broad St. Stations may be seen behind the engine of the machine.

Mr. W. Whitney Christmas

A GIANT AMERICAN MONOPLANE

Designed to carry 160 passengers, the Christmas monoplane has a span of 262 ft. and a power of 8,800 h.p.

Mr. E. Eliot Green

SIZE in anything appears to exert a peculiar fascination on the human mind, be the object a railway bridge, a building, a liner, or any other engineering structure. In aircraft also this peculiar fascination is to be found, and the general public has had a good deal of opportunity to be impressed during the past year. So far the outstanding example has been the large Dornier flying-boat Do. X, fitted with 12 " Jupiter " engines. Now, however, news comes from the United States—that land of large-scale undertakings—of a project which, if realised, will make the Dornier Do. X look like a light 'plane !

Unlike the Dornier and other recent large aircraft, the new American machine will be a landplane, thus still further confusing the arguments of the two " schools," one of which maintains that there is a very definite limit of useful size in any heavier-than-air craft, and the other that the limit is not yet in sight, but that if it does exist, it will be reached more quickly in the landplane than in the flying-boat, due to the fact that the loads on a flying-boat hull are distributed while in the case of a landplane they are concentrated on the wheel undercarriage.

The new American project owes its inception to Dr. William Whitney Christmas, vice-president of the General Development Company of Connecticut, and Reid, King and Company, bankers and brokers of Hartford, Conn., are financial sponsors of the enterprise. The chief engineer of the General Development Company is Mr. E. Eliot Green, who was previously aeronautical engineer to the Department of Commerce at Washington, and who designed the Waco machine which won the 1928 Spokane trans-continental air Derby.

It is quite in keeping with the spirit of the undertaking that no less than four machines are being built at once, although prudence might have dictated thorough flying tests with the first machine before proceeding. Any new aircraft type is apt to have teething troubles. Even quite " ordinary " types have been known to exhibit vices that were totally unexpected. However, apparently the engineers of the General Development Company are satisfied, from calculations and wind tunnel tests, that all will be well, and are putting in hand no less than four machines, the cost of which is estimated at two million dollars.

Fundamentally the new American giant, which for convenience we will call the " Christmas," is a twin-fuselage cantilever monoplane, with engines mounted in the fuselages and driving tractor airscrews. Constructionally the machine is an all-metal structure, but unusual in that in spite of its steel construction the covering is of plywood. The passengers' quarters (designed to give accommodation for 160 passengers, exclusive of a crew of 17) are located partly in the wing (which has a maximum depth of 9 ft.) and partly in the two fuselages. The engine arrangement is unorthodox in that, although but two airscrews are employed, there are eight engines, four in each fuselage driving via clutches. Finally, it should be pointed out that two versions will be produced: one for passengers and one for freight.

Technical Data

The following data, unless otherwise stated, refer to the passenger-carrying type.

Length, o.a.	138 ft. (42·1 m.).
Height	31 ft. 6 in. (9·6 m.)
Wing span	262 ft. (80 m.)
Wing area	10,370 sq. ft. (963 m.²)
Wing chord (maximum) ..	55 ft. (16·75 m.)
Wing chord (minimum) ..	26 ft. (7·93 m.)
Chord taper	51·6 per cent.
Thickness taper	28·6 per cent.
Aspect ratio	5·76
Aerofoil section	Modified CYH
Area of ailerons	720 sq. ft. (67 m.²)
Area of tailplane	1,040 sq. ft. (96·7 m.²)
Area of elevator	560 sq. ft. (52 m.²)
Area of fins	330 sq. ft. (30·7 m.²)
Area of rudders	270 sq. ft. (25·1 m.²)
Dihedral angle	5°
Angle of incidence	2°

Estimated Weights

Tare weight	90,000 lb. (40,900 kg.)
Fuel and oil	20,000 lb. (9,100 kg.)
Disposable load	35,000 lb. (15,900 kg.)
Gross weight	145,000 lb. (65,900 kg.)
Wing loading	14 lb./sq. ft. (68·5 kg./m.²)
Power loading	16·5 lb./h.p. (7·5 kg./CV.)

Estimated Performance

Maximum speed, sea level ..	145 m.p.h. (233 km./h.)
Minimum speed, sea level ..	60 m.p.h. (96·5 km./h.)
Climb to 5,000 ft. (1,525 m.)	in 6·5 minutes.
Climb to 10,000 ft. (3,050 m.)	in 16·6 minutes
Service ceiling	13,500 ft. (4,120 m.)
Absolute ceiling	15,000 ft. (4,570 m.)
Endurance at cruising speed	7 hrs.
Range at cruising speed ..	800 miles (1,290 km.)

The disposable load of 35,000 lbs. is made up, in the passenger type, of 160 passengers with their luggage, a crew of 17, and consumable stores. In the freight type of machine there are, of course, no passengers, and the crew is reduced to 9.

Structural Design

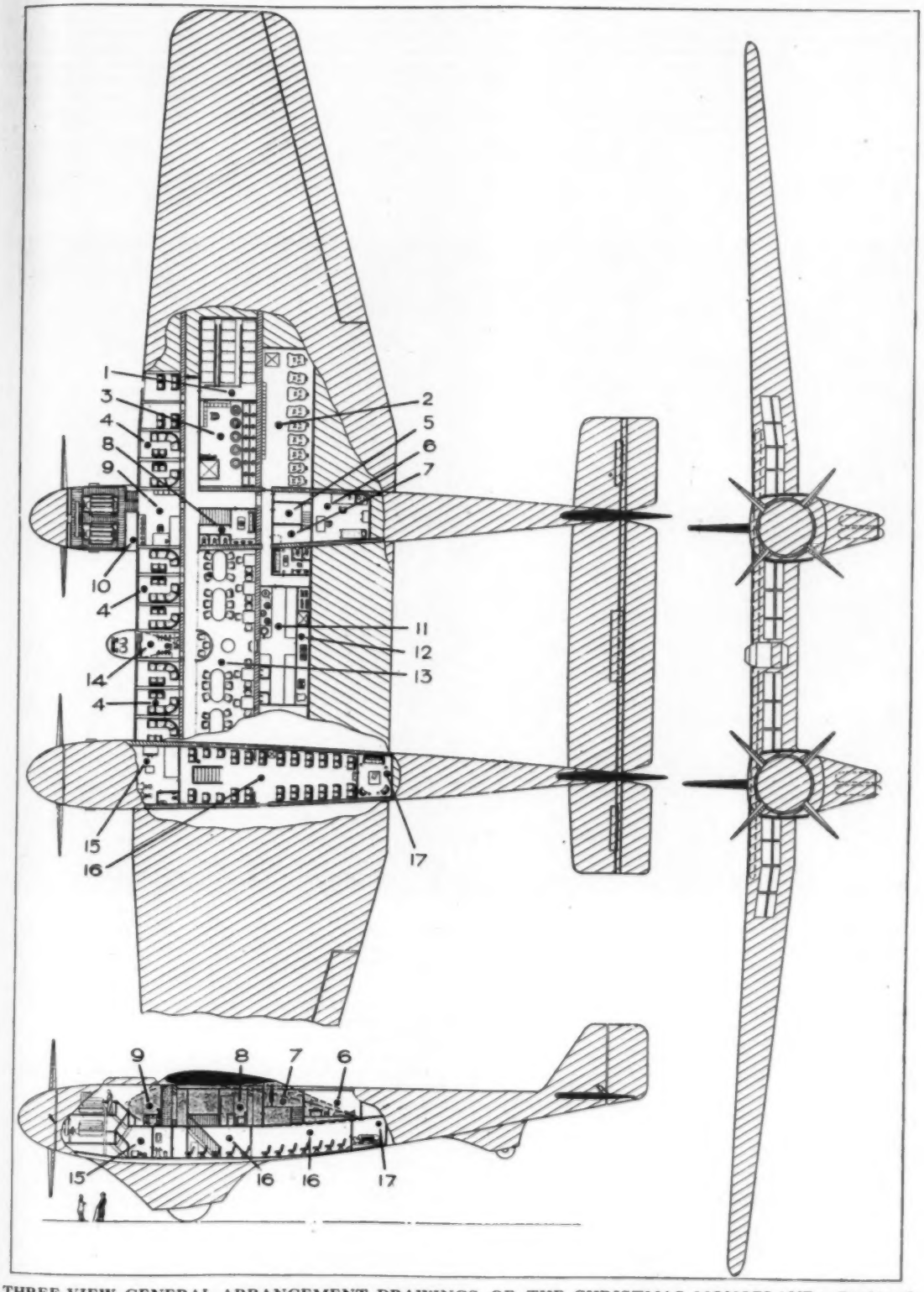
The two fuselages are girders constructed of steel tubing, and covered with ply-wood. Their overall length is about 130 ft., and the maximum cross-section measures 18 ft. by 14 ft.

The cantilever monoplane wing is also of steel construction, with, it is stated, two main spars " of heat-treated alloy steel tubes arranged in a novel manner without welding, to permit some flexure without imposing uncomputed stresses." The wing ribs are, generally speaking, of the form of construction used in fuselages of smaller machines, *i.e.*, steel tubes joined by welding. In the interior of the centre-section of the wing the ribs have been designed with arches so as to afford a free lateral passage or corridor without unsightly bracing members. The height in this corridor is sufficient to permit a person of average height to walk from one wing to the other for a distance of approximately 170 ft. In the outer wing portions the rib construction is the usual, with diagonal members.

The undercarriage of a machine weighing something like 65 tons presents a considerable problem. In the Christmas monoplane each fuselage carries an undercarriage consisting of twin wheels of 6 ft. diameter mounted on a very substantial structure and partly enclosed in a streamline casing or " trouser leg." Inside the wheel fairing is a waste heat boiler which supplies heating to the interior of the machine, and here also terminate the exhaust pipes from the engines.

Power Plant Installation

Not the least unusual feature of the Christmas monoplane is formed by the engine installation. In the nose of each fuselage is a unit comprising four separate engines of 1,100 h.p. each, so arranged with clutches and gears that any engine or combination of engines can be " cut in " or " cut out."



THREE-VIEW GENERAL ARRANGEMENT DRAWINGS OF THE CHRISTMAS MONOPLANE: Designed by Mr. E. Eliot Green, of the General Development Co., of Connecticut, this machine is the most ambitious ever produced. In the drawings above the numbers indicate: (1) fuel tanks, (2) mail compartments, (3) luggage, freight and hoists, (4) passenger cabin, (5) purser's office, (6) officers' quarters, (7) observation decks, (8) lavatory and rest rooms, (9) engine control balconies, (10) engine room, (11) kitchen, (12) food storage, (13) dining saloon, (14) control room and pilot house, (15) engine and machinists' section, (16) passenger saloons, (17) smoking rooms.

The engines are symmetrically arranged around the propeller-shaft, each unit of four engines forming a letter X when seen in front elevation. It is stated that there is ample space between the walls of the engine housing and the engines themselves for engineers to walk about and attend to the individual engines and equipment, ladders giving access to the upper engines. The engines, by the way, are stated to be "chemically cooled at a saving of one-third the weight of radiator and water." Starting is accomplished by an air system comprising a small internal-combustion engine driving an air compressor and a valve mechanism to feed the air to the proper cylinders. One engine is started by this means, the other three of the unit being declutched. When one of the engines has been started, its power is used for starting the other three. The auxiliary engine also drives an electric generator unit for lighting and utility power (*i.e.*, luggage hoists, etc.).

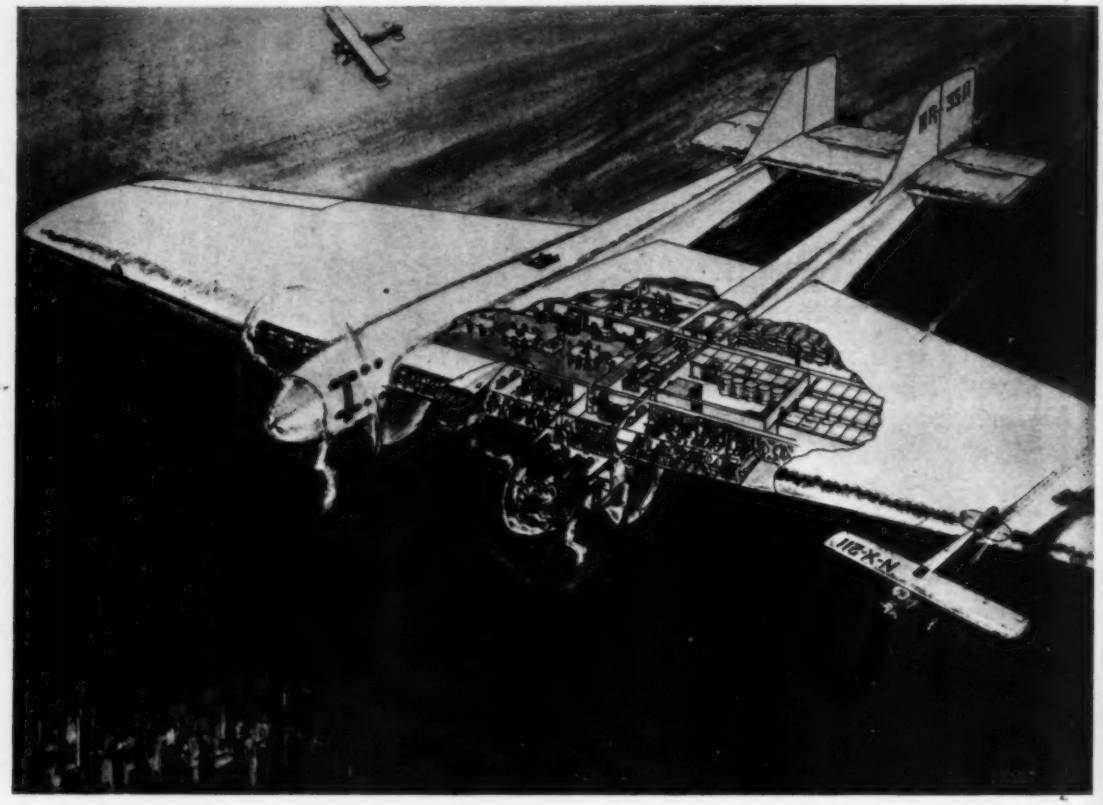
The airscrews are of metal, and are of the variable-pitch type. It is assumed that as gearing is in any case required to enable four engines to drive one propeller, a reduction is employed enabling the large-diameter (34-ft.) airscrews to run at low speed. An examination of the illustrations indicates that a very large percentage of the diameter is shielded, but doubtless this was unavoidable if the space necessary for gears, etc., was to be provided without an undue forward prolongation of the propeller-shaft.

In the engine room, above and behind the power unit, is a balcony for the engineers, with all engine-control levers, tool racks, master ventilators, instruments, propeller pitch-angle adjustment gear, etc. Here also are located two 50-gallon gravity fuel tanks, replenished by mechanical pumps from the main tanks (capacity 3,200 gallons).

Passenger Accommodation

In the passenger-carrying version of the Christmas monoplane accommodation is, as already stated, provided for 160 passengers, located in the forward central portion of the wing, and in parts of the two fuselages. Along the leading edge the passenger accommodation is arranged in 14 compartments, each seating from four to six people. View is provided by transparent sections in the leading edge. All these compartments are served by the corridor which runs laterally from one wing to the other.

The passenger accommodation in the fuselages comprises, in each, a saloon situated aft of the rear spar and on the lower deck of the double-deck arrangement into which the space is divided. Each saloon seats 42 people in single and double chairs, and aft of the saloons are card and smoking rooms. All the cabin compartments are arranged to be made up into berths, if desired.



AN ARTIST'S IMPRESSION OF THE MONOPLANE : With a span of 262 ft. and a gross weight of 145,000 lbs., this machine will be by far the largest heavier-than-air craft ever constructed. (Drawing copyright by the General Development Co., of Connecticut).

In the rear portion of the centre section of the wing, aft of the rear spar, *i.e.*, aft of the corridor, is a dining-room with accommodation for more than 40 diners, seated at three-place and six-place tables.

The kitchen is located in the trailing edge of the centre section, just aft of the dining-room, and electric stoves are provided, the current being delivered by the electric generators in the engine rooms. Finally, in the extreme rear portion of the trailing edge is a storage space with electric refrigeration and hoists for handling foodstuffs directly from the ground through a door in the lower wing surface.

Crew's Quarters

The passenger-carrying type will have a crew of 17, including a master, a radio operator, two pilots, a purser, two engine men, two machinists, eight cooks, waiters, and stewards. The crew's quarters are arranged in the fuselages, on the upper deck (above the passenger saloons).

The cockpit for the master and the two pilots forms a bulge on the leading edge of the wing, centrally placed, and non-splintering glass windows enclose practically the whole of the protruding portion, so that the pilots have a good view

in almost all directions. The aft portion of the pilot-house is reserved for the master and the wireless operator, and has, in addition to the wireless transmitters and receivers, engine control signals, telephones, a chart table, etc.

We are informed that 62 engineers are now hard at work getting out the production drawings for the new giant monoplanes, and it is hoped that the first machine will be finished and ready for test flights in the autumn of 1930.

"MARTLESHAM IS PLEASED"

FROM the fact that whenever an aircraft firm has produced a new type, and one discusses it with a representative of the company, the remark is nearly always made "Martlesham is very pleased with it," one may conclude that to say of a British aircraft that "Martlesham is pleased with it" is about the highest praise which it is possible to give. "Martlesham" is, as probably the great majority of FLIGHT readers will know, short for the Aeroplane and Armament Experimental Establishment at Martlesham Heath, Suffolk, the air station to which all new types of aircraft go to be officially tested, be they service or civilian machines. Martlesham is a Royal Air Force establishment, manned very largely by R.A.F. personnel. At Martlesham new types of aircraft are tested for performance, controllability, stability, manœuvrability, and all sorts of other "ilities," and by the time Martlesham has finished with a machine there are few of its features which escape scrutiny and comment. Consequently it is small wonder that if the officers and technical experts of the establishment are fairly unanimous in reporting favourably on an aircraft, that machine is as near perfect as doesn't matter.

Martlesham is not always pleased. In fact, Martlesham is very difficult to please. An establishment which has passing through its hands every new type of aircraft produced in England is likely to be critical, quite apart from the fact that its business and whole *raison d'etre* is to be critical. But the methods of testing in force there, and which have been evolved from years of experience, are such that no private company is in a position to question them. Moreover, and what is, perhaps, even more important, Martlesham has established and maintains a reputation for scrupulous impartiality which, we venture to think, is not equalled anywhere in the world. Or if it is, it certainly is not exceeded; that would be impossible.

Views such as those which we have just given above were expressed on all sides at the Annual Dinner which Wing-Commander Victor O. Rees, O.B.E., and officers of the Martlesham Establishment, gave at the officers' mess on Friday of last week to representatives of the aircraft industry.

Wing-Commander Rees presided, and as is usual on these occasions, a spirit of the utmost friendliness pervaded the gathering. The company sat down to dine at 7.45, and did not leave the tables until 11.45. That may sound rather like an ordeal, but in point of fact it is to be doubted if a single member of the company realised how the time had flown.

Speeches were made out of number. Far too many, it might be said. But really, they were all interesting, even if some of the speakers were unable to comply with requests to "tell what they did in Berlin." Mr. Handley Page spoke on behalf of the "contractors," and managed to speak also a little on behalf of Mr. Handley Page. Others who added their sentiments were Mr. Bruce, of Westlands; Mr. Robert Blackburn, of Blackburns; Capt. Paul, of Boulton and Paul; Mr. Pierson, of Vickers; Maj. Wright, of Fairey's; Maj. Green, of Siddeley's; Mr. Lappin, of Rolls-Royce's, and Mr. Winter, of Napiers; not forgetting Mr. John Lord, of Saunders-Roe, who, because of his fame as a teller of stories, is never permitted to be serious even when, as does happen, popular opinion to the contrary, he wishes to be.

It is not proposed to give here a detailed report of the speeches. After all, this gathering was very largely a "family" affair, and as such should be exempt from publicity. But one is in duty bound to record the fact that the dinner was held, if for no other reason than to illustrate the cordial relations between "the trade" and the unit of the Royal Air Force which has done so much, by refusing to pass anything but the best, to place British aircraft in the high position which it occupies to-day.

THE LONDON AEROPLANE CLUB RELAXES

THE gathering together of the members of the L.A.C. at the Park Lane Hotel on Friday last would have been a healthy object-lesson to anyone who may have been under the impression this very active flying club was hanging fire. The big dining-room was filled to its holding capacity by some 350 diners and dancers, whose happy faces—one and all—reflected the enjoyable function they had combined to produce, under the experienced and guiding hand of Comdr. Perrin. Following an excellent dinner, it fell to Major K. M. Beaumont, D.S.O., the chairman of the Club, to invite honour to the King—wisely, the one and only toast of the evening. With very few exceptions, the entire company was one of the younger generation, out just to have a good time, and to have inflicted upon them samples of the usual boring after-dinner platitudes would have amounted almost to a crime. Instead, a flying member, Mr. T. A. Wills, took the limelight, and in a highly amusing and much appreciated monologue kept the stage from waiting until he precipitately gave way to one of the most accomplished, amusing, and convincing conjurers in the person of Mr. Douglas Dexter, it has been our privilege to witness. In addition, with intervening moments filled by music more or less tuneful from the orchestra, either solus or giving opportunity to practically the entire company taking the dance floor, a series of hilarious dances and gyrations followed one another with lightning speed, provided by the West End Follies. Until what time the fun was kept up deponent knoweth not, but from the energy and life apparent on all sides, it was probably *quite* after midnight before the dancers faced the raging elements which greeted them at the hotel exit. Who was just responsible for the function in detail one does not know, but the result left no doubt as to the success of their efforts, and this amazing gathering thereby promises to expand abnormally for future "annuals," to the good of the cause of flight generally and, deservedly, in particular to the London Aeroplane Club.

African Air Surveys

THE council of the London Chamber of Commerce has approved of a memorandum, drawn up by its East African and Civil Aviation Sections, which is to be submitted to the British Government. This emphasizes the importance of conducting a comprehensive aerial survey of the East African territories under British rule, to determine their mineral and other resources, and their best lines of development.

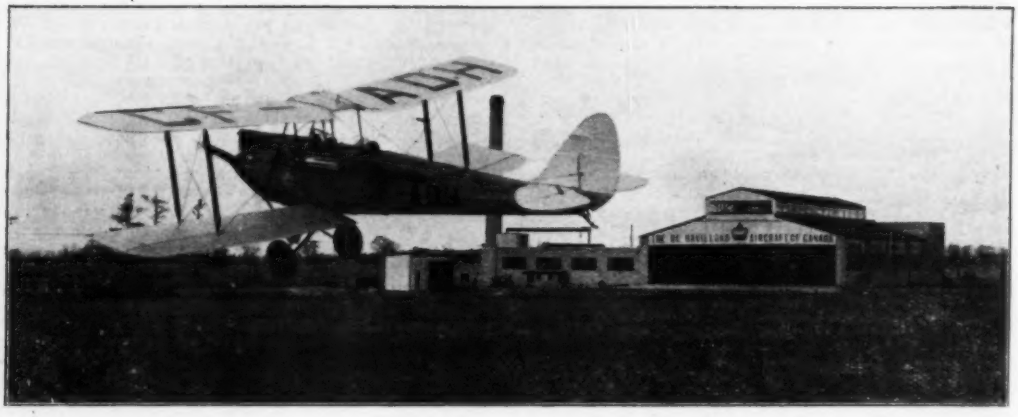
The biggest air survey contract yet given to a commercial company has just been awarded to the Aircraft Operating Co., Ltd., by the Governor of Northern Rhodesia, who has been authorized by the Secretary of State for the Colonies to accept the company's offer to carry out an air survey of 63,000 square miles of Northern Rhodesia, and also a more detailed survey of six townships, totalling 150 sq. miles. We hope to give full particulars of this survey next week, but it may be mentioned here that the special air survey machine built by the Gloster Aircraft Co., Ltd. (the A.S. 31) will be employed on this work. This machine has already been described in FLIGHT, but the following figures of performance on test flight at Martlesham may be of interest:—Weight, 8,500 lbs., including 240 gals. fuel, 31 gals. oil, and 460 lbs. survey loads.

Height ft.	Max. speed m.p.h.	Rate of climb t /min.	Time to height mins.
0	139	1,840	—
5,000	138·5	1,420	3·2
10,000	135·0	1,040	7·4
15,000	128·5	650	14·2
19,000	120·0	320	22·7

Service ceiling, 21,900 ft. Absolute ceiling, 23,200 ft.

Ceiling with one engine at 8,500 lbs. = 10,000 ft. Stalling speed, 44 m.p.h. Maximum permissible flying weight, 9,000 lbs.

PRIVATE FLYING AND CLUB NEWS



A "Moth" with very appropriate registration letters at the D.H. works at Toronto

THE EAST-WEST AUSTRALIAN RACE: From a letter received from the Secretary of the De Havilland Aircraft Proprietary Co., Ltd. :—The start was at 7.30 a.m. on September 30. The first machine to leave was the Curtiss Ireland Meteor, followed by a Klemm monoplane with a 40 h.p. Salmson engine, followed at intervals by eight "Gipsies," Next Miller, in a Puma "9," followed by two more Gipsies, then came the resuscitated Sopwith Gnu, with a Wright Whirlwind engine, and now came Major de Havilland flying alone in the special "Turkish Bath" streamlined Gipsy. "Bertie" Heath flying Cobham's old "50" was last to leave, but was delayed for over an hour with engine trouble.

A few details of the "Turkish Bath" will be of interest.

We fitted the special racing heads, racing chassis and wheels, covered in front cockpit, fairing behind pilot's head and filler neck of front tank, top plane trailing edge carried right through and centre section built out to suit, and several other little refinements to give a bit of extra speed.

The first stage was to Junee, 240 miles, and the first machine, Miller (D.H. 9) arrived at 10.8 a.m.

Lunch was taken here, and the second stage to Melbourne began at 1.30 p.m.

At Melbourne Miller again arrived first, at 3.59 p.m.

At the end of the first day C. D. Pratt (D.H. 60 G) was leading on handicap, and won the sectional prize of £50 for the best handicap flight.

The next day's stages were from Melbourne to Nhill, 225 m., and in the afternoon Nhill to Adelaide, 200 m.

When the machines left Melbourne there was a head wind blowing of 40-50 m.p.h.

No one was able to fly a true course, owing to the strong winds. With the exception of Baker in the Klemm, which had been forced down at Ararat, everyone turned up at Nhill; Heath (D.H. 50) 10.9 a.m., being first.

The journey from Nhill to Adelaide was most uninteresting, for nearly 130 miles they had to travel over a featureless desert, and then came the Mount Lofty ranges, with Adelaide on the other side.

The first arrival at Parafield Aerodrome was Bertie Heath, in the D.H.50, at 4.42 p.m.

The third day's stage was from Adelaide to Kimba (180 m.), and Kimba for Ceduna 170 m. in the afternoon). All the competitors left, including the Klemm monoplane, which had arrived from Nhill that same morning, with the exception of Maj. De Havilland, who could not get his engine to start, losing 16 mins. before he got off. Kimba was decorated for the occasion, which coincided with the opening of their new aerodrome. First to arrive were Miller in the "9" and Heath in the "50." These two had a neck-to-neck struggle.

The last stage of the third day was to Ceduna. For the first 70 miles all the competitors, with the exception of Heath, had to rely on their compasses as the plains are devoid of all landmarks. Heath knows this route, as he pilots the Hercules on the mail run from Perth to Adelaide. Maj. De Havilland fought a duel with Heath on the last 20 miles of this lap, and they raced right up to the finishing line, but Heath just got his nose in first. It was here that De Havilland made a replacement, the only one throughout the trip, when he found his propeller damaged.

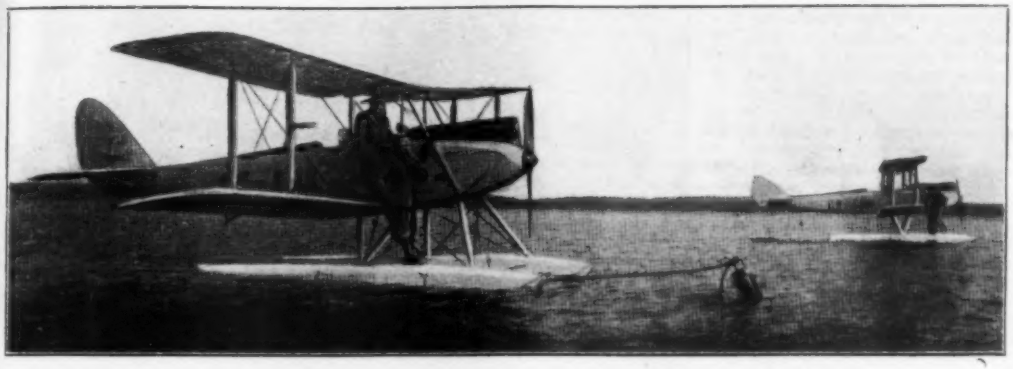
The fourth day was from Ceduna to Cook in the morning (230 m.) and Cook to Forrest in the afternoon (140 m.).

All had emergency supplies of water and rations, because the journey to Cook was one of the most hazardous of the whole journey. Across the Nullabor Plains, the machines raced over country,which is absolutely featureless, where the sun makes it practically impossible for anything to grow or live. Rain once about every ten years!

Heath and Maj. De Havilland again fought out a thrilling finish, but once more the "50" landed just in front. Heath did the stage of 220 miles to Cook in 93 minutes.

The journey to Forrest took the fliers over the remaining

Flt.-Lt. Eaton leaving Essenden for N'hill



Canadian Club Seaplanes. The Halifax Club's Moths at their moorings.

parts of the Nullabor Plains but they had the Trans-Australian Railway to guide them, without a bend for 303 m. !

As usual, Heath and Maj. De Havilland were fighting out the finish, but this time Heath was about to pass, flying very low, when he lost his goggles, and the machine hit the ground and lost a wheel. Heath flew on and just got to Forrest in front, but in landing, the undercarriage collapsed on the one remaining wheel, and the machine went over on her nose. Another propeller and wheels were obtained and mechanics worked all night to get her ready for the next day.

The stages of the fifth day were Forrest to Rawlinna (170 m.) and Rawlinna to Kalgoorlie (225 m.).

De Havilland was first home at Rawlinna at 9.7 a.m.

The race continued to Kalgoorlie over some very dangerous flying country, a belt of trees stretching for several miles. The heat was trying, and most of the competitors showed signs of wear and were thankful to see Kalgoorlie.

On this stage Maj. De Havilland got away from the other machines, and landed first at 3.57 p.m. Heath was next at 4.2 p.m.

With only one day left to complete the race, the leaders were Pratt (D.H. 60 G), Miller (D.H. 9), and De Havilland (D.H. 60 G) respectively on handicap, with De Havilland a good first in the speed event.

The two stages on the final day were Kalgoorlie to Tammin (250 m.) and Tammin to Perth (110 m.).

De Havilland, Heath and Miller had a battle royal to Tammin, and finished in the above order with only a few seconds between them.

Unfortunately, the race to Tammin was marred by an accident to Gipsy Moth VH-UKX, owned by Mr. Jim Guthrie, who was the observer, and flown by Charlie Pratt, of Geelong. They, like the others, were flying very low, when they bumped a tree and wrecked the machine. Both occupants were injured, but recovery is probable.

Pratt up to the time of his crash was leading on handicap.

When the contestants took off for Perth a gale was blowing, and a blinding rain-storm made the conditions bad.

A big crowd waited at Perth to see the arrival of the airmen, despite the atrocious weather. First to finish was Bertie Heath in Cobham's "50." Next was Murray (D.H. 60 G), 3.2 p.m.; Bardsley, 3.3 p.m.; Miller (D.H. 9), 3.7 p.m.; Cunningham, 3.7 p.m.; De Havilland (D.H. 60 G), 3.7 p.m.; Davies, 3.7 p.m.; Pentland, 3.17 p.m.; McKay, 3.18 p.m.; Manifold, 3.24 p.m.; Knapman, 3.25 p.m.; Eaton, 3.26 p.m.; Penny (Avian), 3.33 p.m.; Baker (Klemm), 3.49 p.m.; Farmer (Sopwith Gnu), 5.9 p.m.

Several Wapitis of the R.A.A.F. accompanied the machines on the route, carrying the official organisers, Mr. Guy Moore, and the several judges, etc., whose duty it was to give reports on wind velocity and direction, which facts were taken into consideration on the handicapping.

The handicapping was carried out on rather novel lines, although they were very bewildering at times. The calculations were based upon the known performance of the machine in still air, modified by further calculations involved by improved performances due to streamlining, etc.

The three fastest times for the whole race were: De Havilland (D.H. 60 G), 22 hrs. 50 mins. 23 secs. (winner); Heath, 23 hrs. 24 mins. 51 secs.; Miller, 23 hrs. 31 mins. 58 secs.

Miller was placed first on the handicap, thus winning the £1,000 first prize; De Havilland was placed second, which entitled him to another £300; and Cunningham was third.

Cunningham (D.H. 60 G), Knapman (D.H. 60 G), Manifold (D.H. 60 G), Bardsley (D.H. 60 G), McKay (D.H. 60 G), are all club-trained pilots, and are purely amateur private owners who have had very little experience of cross-country flying. The fact that they all got through to Perth speaks a lot for their splendid efforts, when it is remembered that they were competing with cross-country cracks in Heath, Miller, and De Havilland.

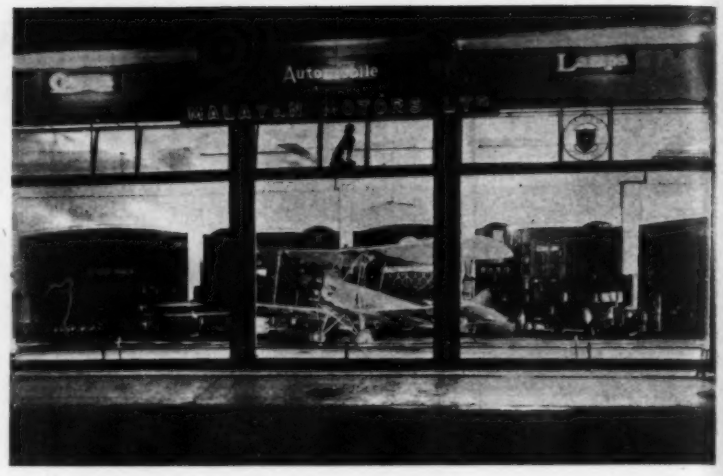
No case of serious mechanical trouble was experienced, even though practically all engines were run at full throttle (2,100 r.p.m.) the whole way from Sydney to Perth, at altitudes well below 500 ft., and in the heat of the Nullabor Plain.

The Gipsy engine of VH-UIQ, which made fastest time for the race (average speed 107·8 m.p.h.), was standard except for cylinder heads, carburettor and induction pipe, and was run, *for the whole course, at speeds varying from* 2,300 *to* 2,400 *r.p.m.*, and the petrol consumption (5·8 galls. per hour) was actually slightly less than that of the standard Gipsies, which were not fitted with variable mixture controls. Oil consumption was under three-quarters of a pint per hour.

An aerial view of the D.H. Toronto works.

THE SINGAPORE FLYING CLUB managed to get in 98 hrs. 30 mins. for October in spite of the bad weather, and the fact that for some time they only had one machine in action. Three members passed the flying part of the test for their "A" licences. Mr. Harvey, their ground engineer, showed that he has things well organised when, on one day, both machines were put out of action due to engine trouble, one at 7.30 a.m. and the other at 6 p.m., yet he had one machine ready with a new engine at 2 p.m. the following day and the other at 5 p.m. Flying before breakfast as they do, shows the spirit which prevails!

THE LONDON AEROPLANE CLUB got four new "A" licences during the month and put in 194 hrs. 55 mins. flying. The Club will be closed on Monday evening, December 23, until January 2, 1930.



Selling "Aviation" in Singapore. A Genet Major Avian in the showroom of Malayan Motors.

THE HAMPSHIRE AEROPLANE CLUB held their Fourth Annual Dinner at the South Western Hotel, Southampton, Friday, December 6. It was unfortunate—so they said—that several other bodies had decided to hold their dinners on the same date, but what would have happened had the rest of those interested in the club been able to come the Lord (and the hotel management) only knows! As it was, there were some 150 persons present, amongst whom were Lord Apsley (the Chairman), the Mayors and Mayoresses of Southampton Winchester, and Bournemouth. Sir Sefton Brancker, Lt.-Col, Ormonde Darby, Group-Capt. and Mrs. Nanson (O.C. Calshot), Capt. Stack, Sir A. V. Roe, Flt.-Lt. Bentley, and Sqd.-Ldr. Hinkler. The dinner was excellent, and dancing was carried on till the early hours.

The Rev. E. Bruce Cornford in proposing the toast of the "Club," gave statistics showing the position of the club and said that with their four machines they had flown, up to date, this year, some 1,600 yards!—this caused much amusement, and was hurriedly altered to 1,600 hours. They had, he said, 420 members, 100 "A" licence pilots, 35 of whom had secured their tickets during the present year, thus enabling the club to apply for the maximum Air Ministry Subsidy of £2,000.

Sqd.-Ldr. Hinkler, in replying, said that the list of achievements in meetings and races which the club had as its record was very creditable and their efficiency was shown by their qualifying for the maximum subsidy. He visualised the day when a new form of light aeroplane would arrive which would not restrict the owners to landing upon the ground.

Col. Darby proposed the toast of "British Aviation" and opened by saying that in the face of who was going to respond to this toast he felt distinctly scared as Sir Sefton Brancker *was* British Aviation, and therefore much more qualified to speak than he himself. He gave a short résumé of the progress from 1903 to the present day and said that he thought it a great pity that the press do not take more part in keeping the excellence of British Aircraft before the rest of the world. He instanced a recent trip of his to Canada, during which he found that people had little or no idea of what we were doing or had done for aviation. We had, he said, lost a glorious chance in the Schneider Trophy. In concluding he said that he felt that every effort should be made to carry on the clubs as they had built up a tradition which should be perpetuated.

Sir Sefton Brancker in replying said that the club had a great record, and had been able to get the maximum subsidy of £2,000. here seemed to be a general air of pessimism about British Aviation, he said, and this should not be so, for we had the quality though not the quantity. The only hindrance to an increase in the quantity was the lack of money, and that was now coming as well. He instanced many things in which we had been first in, in aeronautical matters, a fact that was not made enough of. He then urged the clubs to co-operate and to put up a definite scheme for the extension of the subsidy. The number of "A" licences issued this year was double that of last year and this was mostly due to the clubs, a similar increase was evident in the number of certificates of airworthiness issued.

Civil Aviation was only costing the country £500,000 this year, and it was worth every penny of it, it seemed very small when they were suggesting an expenditure of £15,000,000 on the Channel Tunnel, a sum which would give far greater value if spent on aviation.

Lord Apsley then proposed "Our Guests." He touched on the achievements of Lt. Bentley and Sqd.-Ldr. Hinkler in their long flights, and also on that of Lady Bailey. He suggested that the Mayors of Bournemouth, Southampton and Winchester would do well to work together to establish an air-port for the south at Southampton.

The Mayor of Southampton in replying said that they had already agreed upon a site near Swaythling of 100 acres, and he hoped that the shipping companies would co-operate to make this an airport for the south of England.

Sir Alliot Verdon Roe proposed the toast of the Chairman and enlarged upon the trip he (the Chairman) took to Australia in order to see for himself how things were there. He suggested that others might follow his example.

Lord Apsley, in replying, said that he got his ticket last October and his wife hoped to do so soon. He regretted that he had not been able to come to Hamble to do his flying, but he lived near Bristol, and moreover Bristol was not a wealthy club, and therefore would welcome the subsidy which came with his ticket. He had, however, been able to put in his finishing hours at Hamble and was very glad to do so. He finished by wishing the club the greatest prosperity.

The N.F.S. Fleet at Hanworth.

Major Travers, Chief Instructor of the London Club, evidently cheered by his Club's progress.
(FLIGHT *Photo.*)

THE NORTHAMPTON AERO CLUB has gone ahead during November and 6 flying members and 19 associates have joined. The Aerial Beagle Meet was a great success and well attended. The Gliding Section of the Club looks like becoming an actuality before long and much interest is being taken in this. With two machines the flying time for the month was 45 hrs. 55 mins.

THE SCOTTISH FLYING CLUB got in 144 hrs. for October, which must be considered rather a good effort in view of the weather and their proximity to the Pole (as compared with other Clubs!); four "A" licences were secured and two "Gipsy-Moths" have been purchased. Six pilots and four associates have joined as members.

THE HANWORTH CLUB has been loaned the film depicting the flying history of Mons. Blériot through the courtesy of Mr. Alexander Duckham, and it will be shown on January 1, at 8.45 p.m. This film was shown privately last Wednesday by Mr. Duckham and is most interesting. The whole history from the very earliest experiments of towing on the Seine to the present large and efficient machines is shown. One sees such historic events as the Channel crossing, Pegouds "loops" and parachute drops, and finally trials of the Transatlantic machines.

The clubhouse will remain open as usual during the holidays.

In order that the flying staff may have leave on Christmas Day, it has been decided to restrict flying to "solo" flights. Machines for this day may be booked on or before Wednesday, December 18. The ground staff will be available.

A dinner dance will be held on December 27, and also on January 3. The special children's party will take place on Tuesday, January 7. There will be flying from 2 p.m. until 3.30 p.m., followed by a tea party in the clubhouse. Tickets are 4*s*. each.

THE CINQUE PORTS FLYING CLUB with three machines in commission, flew a total of 75 hrs. 35 mins. during November, and two members got their "A" licences. They are taking a very definite interest in the formation of a gliding club and the construction of model aeroplanes is occupying the energies of many members.

A GLIDING club was discussed and the seeds laid for a movement which should have far-reaching effects, at the Comedy Restaurant last Wednesday, December 4. Mr. Culver, an enthusiast, took the chair and there were some fifty-six present. Mr. Dagnell, of the R.F.D. Co. of Guildford, very kindly offered to have two or three gliders built free of cost for the proposed club. Col. the Master of Sempill made the important announcement that the R.Ae.S.I. were very interested in the formation of a club and would do all they could to help forward the movement. They had already invited Dr. Gorgy and Herr Stamer, the Director of the Flying Institute on the Wasserkuppe, to come over from Germany in February and lecture before the Society on the knowledge they have accumulated about gliding. He also intimated that there would be a certain amount of money forthcoming to enable the club to start on a firm basis. A show of hands was made and some thirty-seven agreed to become members of the Central Club to be formed in the London district. Representatives from Northampton, Taunton, Lympne and Hamble expressed their willingness to co-operate and to form branch provincial clubs. The Hampshire Aeroplane Club at Hamble have already some thirty-eight members who are forming their branch and are shortly starting building a glider to the designs of Mr. R. S. Dickson, who will be remembered as the designer of a very promising little light 'plane called the Beetle, details of which were published in the *Aircraft Engineer* recently. The advisability of first buying a German glider and then building on similar lines was discussed, but the general opinion was that we could design our own. This should certainly be the case for in the FLIGHT Glider Design competition which was held in 1923, there was no lack of promising designs from British entrants, and it seems a pity that such designs should not have been used. In the issue for April 12, 1923, we published the details of the winning pair of gliders for this competition, which were the "Turkey Buzzard" by Messrs. R. G. Miller and D. T. Brown, of the Naval Aircraft Factory, Philadelphia, U.S.A., and the "K1" by Mr. R. J. Ashfield of Cheltenham Road, Bristol. We do not wish to decry the German designs in any way as we realise that we can learn a very great deal from them indeed but, with so many young designers waiting their chance to prove that they can "deliver the goods," it would seem that the production of really good English gliders would be just the avenue through which they might graduate to higher things. We hope to see the revival of this sport carried forward to the benefit of all, because there is no doubt that there are a very great number of young men who, through lack of money, have no chance to fly power-driven machines and who would welcome the chance to participate in the sport of gliding.

SIR HUGH CLIFFORD, late Governor of the Straits Settlements, who is 63 years old, is to take up flying with a view to qualifying as an owner-pilot.

"We know where the floods come (from) in the winter Time"; Our photographer views Boulter's Lock from a comfortable—and dry—position. (FLIGHT *Photo.*)

FLYING AND MAINTENANCE FROM THE OWNER'S POINT OF VIEW

(*Being the conclusion, from page* 1286, *of Sqd.-Ldr. Probyn's lecture*)

FRANCE is the ideal touring ground for the light aeroplane. On the whole it is good flying country. Housing and landing is very cheap. Petrol and oil much the same as in England. Aerodromes are well organised. Hotels and transport are much cheaper than in England. One requires a triptique costing 25*s*., obtainable from the Royal Aero Club, a passport and a journey log book. A tour through France, Belgium, Holland, Germany and Italy by light aeroplane can be accomplished as cheaply as by a 14 h.p. car. There is no freightage across the Channel, and no deposit, and should you extend your tour to Northern Africa the balance is well on the side of the aeroplane. I find that £3 10*s*. per day for two people is sufficient for a tour in France. This includes petrol, oil and aerodrome charges for 300 miles, flying every fourth or fifth day. Here is a list of approximate charges for landing and housing (per night) at State aerodromes for a light two-seater type of aircraft. There are numerous variations, for instance, if housed in a canvas hangar in Germany the charge is 50 per cent. cheaper. Fees for landing at night are doubled, and there is an extra charge for lighting. Landing fees :—

Great Britain	France	Belgium	Germany	Italy	Holland
2/6	10*d*.	2/9	3/6	3/1	2/-
Housing fees :—					
5/-	1st 48 hrs. nil then 10*d*.	3/6	6/-	4/7	4/-
Petrol, No. 1 :					
1/10	1/10	1/8½	1/9	2/-	1/7
Oil (castor R.) :					
10/6 per gal.	17/9	—	16/9	16/1	—

Your personal kit and your passenger's requires more consideration than it would if you could take unlimited baggage, although my wife and I carried as much as we required in reason. Good warm clothes for winter flying are essential. My passenger has a bag made of an old eiderdown and a rug, which she gets into and keeps warm. The passenger's seat is totally enclosed by means of a sliding celluloid roof. There are windows in the side of the compartment. This roof shuts out the wind and a good deal of noise. Therefore, no helmet or goggles are required. I have a telephone speaking tube, shaped like an ordinary old-fashioned electric telephone, which is satisfactory.

I wear a Sidcot suit and rubber snow overshoes over my shoes. I think lined trousers like the Sidcot and a lined trench coat would be better, as the coat could be used away from the aircraft, and would be easier to put on. I wear an old-fashioned pullover leather helmet as it keeps one's chin and throat warm, and does not catch one's throat like a strap helmet. No scarf is required. I use mask goggles and find them O.K. Gloves according to one's fancy; woollen ones are not too bad, but for heights in winter, fur, four fingers in one.

Aircraft and engine spares depend on your piloting ability, mechanical knowledge, the distance you are doing and whether you have to be back punctually. A good set of ordinary tools and certain special tools will be required, as well as odd tape, wire, nuts and bolts and certain washers. Engine and cockpit covers fitted with press-on eyes, like those on car hoods, are quick to put on. A means of lashing the stick control should be standard. Good picketing gear is essential. I have not found dural pickets much use. Steel ones are better, but heavy, and are no use for rock or sand. Two sacks and a shovel are the best, with hook-on cables. The backs and fronts of wheels should be chocked and the tail fastened down, usually by the skid post.

One receives better attention at small aerodromes in France than large terminus ones like Le Bourget. Passports and triptiques and certain documents, such as manifests and notice of departures require to be handy when crossing frontiers, to save time, and together with maps go into an attaché case.

A good compass, properly swung, is a necessity, so is a good watch and maps, and I would recommend a Very pistol and lights for a sea crossing, or a hurried forced landing, to give one wind direction or to obtain assistance.

I would particularly emphasise the necessity of good maps on not too small a scale. The scale depends on two or three main factors :—(1) The distance you propose to cover in one hop; (2) your ability to make out your compass course, take your drift and steer well; (3) the presence on the ground of good features easily recognised, such as large rivers, lakes, main railways. I have toured England and France on maps taken from a 30*s*. *Times* Atlas. If one has plenty of petrol in hand, easily recognisable ground features and some knowledge of air pilotage, then a small scale map, say 6 or 10 miles to 1 in., is more convenient, but if you are likely to meet bad weather, run you petrol fine, or to get caught out in failing light, take a large-scale map, say 4 miles to 1 in. Hills, rivers, railways, lakes and aerodromes should be clearly marked.

A time table when flying is very necessary if you wish to get to your destination by the quickest route and not by the railway, river, or road. It need not be done before starting, just jot down the time you pass any recognised feature, and that, in conjunction with your time of starting, will give you your ground speed. One cannot guess the passing of time in the air and without the time factor you are most likely to get lost. Nine out of ten pilots get lost through carelessness. That ten minutes is well spent in measuring out the distance and putting the protractor on to the map. I do not care how much flying the pilot has done, unless he knows the country or he does some preliminary study, he will get lost. The first ten minutes is the most important.

It pays to fly round an aerodrome and have a good look round before landing. There is nearly always work of some description being carried out. Taxying also requires much care, particularly on large commercial aerodromes, as the ground up to the apron is usually churned up in winter and one is apt to go on to one's nose. Petrol filling points and covers for draining are apt to break one's tail skid.

There was an old tag invaluable for cloud flying, which went thus :—" When in clouds press your compass and follow the bubble," meaning if the right hand side of the card or compass needle comes towards you press it away by right rudder and *vice versa*. This prevents the aircraft from swinging. If the bubble in your inclinometer moves over to the left, put the control column over to the left, in like proportion, and *vice versa*. This, with practice, makes cloud flying in a straight line comparatively simple. Keep the airspeed indicator constant at your touring speed, and the aircraft will be level fore and aft. To turn well in clouds is difficult without a turn indicator. I recommend a slow flattish turn so that the compass does not swing violently.

When making out a compass course, variation must be taken into consideration. It is simpler to ignore deviation (if under 5°), One soon gets into the habit of adding the variation to the true bearing (in the Northern Hemisphere).

I have a simple drift sight consisting of painted lines on the starboard strut of my monoplane, worked out to 25° to port and starboard. I see some object, say a church, passing under a mark on the front of the front strut and I note the mark under which it passes under the back of the rear strut, and read off my drift. This makes course setting simple, your drift added to or subtracted from your required magnetic track, gives you the course to steer on the compass, without bothering with a course and distance calculator. You must use your common sense as to whether you add or subtract.

Cloud shadows on the ground give one an idea of wind velocity and direction and at times are a guide as to the best height to fly.

The figures below are estimated in a year's flying of 150 hours, which may be slightly above the average for the majority of private owners. The aircraft is estimated to last five years, after which time it will be out of date, but still worth something. During the third year the engine would require a complete overhaul and some replacements, costing anything from £90 to £120 (B type), £30 to £40 (C type) and £15 to £25 (D type). The airframe would also requre overhauling after three years and possibly want new fabric (if so covered). Petrol has been estimated as follows :—" B " uses 14 gallons per hour and cruises at 95 m.p.h.; " C " uses 4½ gallons per hour and cruises at 80 m.p.h.; " D " uses 2¼ gallons and cruises at 65 m.p.h. I have not taken into consideration the interest on capital. The insurances are for a good reliable pilot. If he is not, they are liable

to be increased by 50 per cent. Many pilots only insure against third party risk. There is a cabin three-seater air craft of 100 h.p., costing about £750, on the market which would not cost much more than type C to fly.

The cost of flying a private aircraft is less for a service pilot than the figures given below. Exigencies of the service permitting, he is allowed to land and house his aeroplane free. He can also employ service personnel after duty hours through the Station Arts and Crafts Club, to carry out minor repairs. A 14 h.p. car costs about 5½*d.* per mile to run. I understand that a 30-ft. motor cruiser costs about £200 per year to run.

ESTIMATED MAIN EXPENSES INCURRED ANNUALLY ON THREE TYPES OF AIRCRAFT

	300 h.p. 3-engined cabin, 5-seater aircraft, costing approx. £3,700			90 h.p. 2-seater, costing approx. £650			45 h.p. single or occasional 2-seater, costing approx. £400		
	£	s.	d.	£	s.	d.	£	s.	d.
Depreciation	740	0	0	130	0	0	80	0	0
Insurance—									
Flight risks	296	0	0	50	0	0	40	0	0
Third party	15	0	0	10	0	0	10	0	0
Housing ..	100	0	0	50	0	0	40	0	0
Fuel	151	17	6	50	12	6	25	6	3
Oil	27	6	0	9	2	0	4	11	0
Maintenance—									
Engines ..	30	0	0	10	0	0	5	10	0
Aircraft ..	15	0	0	5	0	0	3	0	0
Certificate of airworthiness	5	5	0	5	5	0	5	5	0
Wages (pilot-mechanic) ..	375	0	0	Nil			Nil		
	£1,755	8	6	£319	19	6	£213	12	3
Estimated mileage ..	14,150			12,000			9,750		
Per aircraft mile.. ..	2/5·7*d.*			6·4*d.*			5·26*d.*		

Suggested Improvements

Noise is undoubtedly bad at present, not only for the occupants of the aircraft but for people on the ground. The exhaust question is not too difficult and many aircraft are noticeably quiet. The airscrew noise is likely to last until we get geared engines. Many cabin aircraft drum badly, but the exhaust noise is less noticeable than in an open cockpit aircraft. The modern five and 2-seater aircraft can be fitted with a silencer without too much loss of efficiency.

Brakes are necessary for aircraft alighting in small landing grounds and for manœuvring on the ground. I intend, when possible, to try out a parachute brake to be released when landing. It would be attached above and forward of the centre of gravity. It would be an emergency brake only, and its cost, weight and resistance should not be excessive.

Large tyres save many undercarriages. The section of tyres varies in size in each country. On the Continent large diameter wheels and small section tyres are fitted. In America one firm has gone to the other extreme and is fitting large section low pressure tyres to small wheels. Undoubtedly low pressure tyres have a good shock-absorbing effect and, it is claimed, are more streamlined. I notice that I bounce less on landing when my tyres are soft. Whether they are liable to roll off when landing with drift remains to be seen. However, a good case has been made in favour of them. Large diameter wheels must go over rough aerodromes (as distinct from soft ones) better than small diameter. Good windscreens are a necessity for bad weather flying, and some reliable form of wiper in these days of high wireless masts is necessary. Celluloid is not good enough. I find goggles become useless after half an hour's rain.

Many people would be content to take the air on a fine day without good performance as we know it, but the aircraft would have to be safe and easy to fly and reasonably inexpensive in first cost. It should be strong, have good lift, low landing speed and no vices. The top speed need not be high, say, 60 m.p.h. The old de Havilland Six, used in the war to instruct beginners, was something like what one requires and I had a lot of fun on this aircraft.

The Discussion

In opening the discussion, MR. ALAN BUTLER said that in the main he agreed with the points raised by the lecturer, but he disagreed with the idea that a side-by-side seating arrangement was necessary as he felt that sociability could be obtained with the tandem arrangement which gave a very much better performance. In his opinion the forward and downward views were the most important ones and therefore in all probability the high wing monoplane was as good as the low wing. Self starters and brakes he agreed were essential and the necessity to touch the airscrew should be eradicated.

Among other things which he thought should be altered was the shorting wire to the magnetos, this was to his mind, one of the worst inventions in connection with aircraft and the possibility of starting the engine through leaving off the contact breaker cover had not been stressed sufficiently.

He could not agree with the lecturer on the subject of press studs for cockpit covers—he had tried them and they were quite unsatisfactory !

He thoroughly endorsed the views expressed as to the desirability of including compass instruction in every pilot's training.

Using cloud shadows for judging the wind velocity and direction he had also found useful and did not remember having heard this mentioned before.

As regards making forced landings he thought that often he was able to get in to fields that he was unable to get out of.

He certainly could not agree with the lecturer on the subject of the lack of necessity for shock-absorbing legs on the undercarriage in fact he suggested that they required more travel.

SIR SEFTON BRANCKER said he was surprised that the lecturer had run the whole course without once abusing the regulations which they all, admittedly, found irksome at times.

He was, he said, in entire agreement about the proposed seating arrangement and thought that before very long all machines would have the seating side-by-side. In this respect he felt that the side-by-side cabin was ideal both for travel and for instruction, and he was sure that the rising generation will not stand for having to scream down a speaking tube. He thought that this arrangement should allow of quicker tuition.

He agreed that the pusher was the coming design, they might lose speed through it but the advantages outweighed the disadvantages.

A suggestion which he would like to put forward was that when designing luggage space, designers would design special suit cases to go into the space provided, then they would have no trouble about stowing them in.

They must have a larger fuel capacity and therefore a long range, that is at least until the N.F.S. had provided them with aerodromes every 20 miles !

On the question of noise he heard that the panel which was now sitting on the subject of noise would soon be able to give them some tangible form of their labours.

There was only one criticism which he had to offer and that was that the audience was for the most part composed of men who knew a great deal about private aircraft and he thought that, in the interests of the science, the Society should try and arrange that Sqd.-Ldr. Probyn should give his lecture before a gathering of people who were ignorant of the subject.

CAPT. DE HAVILLAND said that the question of flying by feel had been raised and he felt that this was rather a misnomer as he was sure that what was usually called feel was not feel at all but was vision-cloud flying and its consequent troubles tended to prove this.

He thought that side-by-side seating reduced the performance too much and that it was quite possible to get a sufficient degree of sociability with the tandem cabin arrangement.

He did not quite agree with the lecturer over the importance of the rudder as he thought that by judicious use of the ailerons one could land with the engine switched off. Tappet greasers, he would like to point out, were provided on modern engines.

Starters he would also like to see incorporated but at present they were too heavy.

On the question of brakes, he thought that there was one aspect of the problem which so far had not been mentioned, and that was that although brakes were efficient in America they were not always so here, which was because over there concrete or hard runways were prevalent, while here grass aerodromes were common and they had found that with the wheels locked it was possible to taxi a machine quite easily over wet grass and the whole subject required attacking from a different angle.

He was not sure that there was a demand for a slow machine

for school work, and if there was the demand would be so small that the price would of necessity be large.

DR. MERTON, who has been running a Moth since 1927, had kept very careful accounts of everything that he had expended on his machine, and he thought that his figures would make an interesting comparison with those of the lecturer.

First of all he would like to know what state of sea was considered usable for light seaplanes, because he had rather gathered from the lecturer's remarks that if there were any waves at all then one might just as well make a forced landing in a land machine as in a seaplane.

With reference to the form of drift sight used by the lecturer, he had evolved a scheme whereby he did not first sight the object as it passed the leading edge, but waited until it was clear of the trailing edge, and then it was possible to very quickly sight its path along a set of angle lines on the wing.

He also found a time table of great help and had fitted a small shelf on which he carried a note book and his time table.

He had tried taking photographs and had found that below 1,500 ft. it was not necessary to have a filter and he had got very good results with a Baby Pathé Cinema camera. His method was to take the pictures on the turn so that the movement past the object was a minimum.

He had fitted a silencer and found that the noise was greatly reduced thereby. He felt that seating comfort could be bettered; they now had office chairs which supported the small of one's back and something the same sort of thing would be very good in aircraft.

In the matter of running costs he found that these came out rather more than Sqd.-Ldr. Probyn's. He would suggest that for the class "B" machine the figure for depreciation remain at £130, that for insurance be raised to £70, that for housing remain at £50, while the running cost he found to come out at 16*s.* per hour, making the total for this class £420 per annum, as against the lecturer's £319. The insurance was the worst item, and he felt that for the good of every one the rates ought to come down.

With regard to the future machine he suggested that they ought to build the machine which was at the same time good for the Colonies and for home, and this machine would be a cabin, probably of metal construction which was easy to repair; it would be built sectionally, so that any section could be replaced as a spare part, and also the size of the sections would be small, so that they could be easily transported to the more outlying districts. Another point was the ease with which an overhaul for the annual C of A could be carried out; it was necessary that this could be done on the spot in the colonies and the sectional system would help toward this.

SQD.-LDR. ENGLAND was not in favour of having the warning device at the stalling point, as he felt that the private owner already had sufficient instruments to cope with, and, moreover, he thought that with present-day machines it was possible to regain control from the stalled condition in 50 ft.

He agreed that insurance rates were much too high, but he pointed out that the personal qualifications of the pilot were taken into account, and against Sqd.-Ldr. Probyn's £50 he would quote the case of a friend of his who learnt to fly, and then with about 15 hours to his credit he bought a machine—he was charged £105 to insure the machine!

He said that he was rather in favour of the low wing, as, in his opinion, the most important view was forward and upward.

He considered slots and brakes not as desirable extras, but as necessities, and the provision of night-flying facilities for private owners could not be withheld much longer, and all machines should be fitted for this.

MR. M. L. BRAMSON said he was for safety first, as he felt sure that it was the fear of a crash which kept people from joining the ranks of private owners in greater numbers than now.

He naturally agreed with Sqd.-Ldr. Probyn on the question of an instrument to warn the pilot of his proximity to the stalling point, and although he had remained silent for the past two years about the particular instrument with which he had the honour to be associated he now felt that the time had come to raise the matter again.

MR. RATCLIFFE (of the Westland Aircraft Works), said that he would like to ask the lecturer why he considered that monoplanes were not so strong for aerobatics as were biplanes. They were, he said, both stressed to the same figures, and he saw no reason for this opinion. He felt that the costing figures would be very useful when they were analysed, and comments of others on them should prove of interest.

MR. GRIFFITH BREWER remarked that when he first heard that Sqd.-Ldr. Probyn was proposing to fly to Egypt he tried to put him off the idea by suggesting that he should go to Spain instead, as it would be safer, but when he next met him and asked how the flight had gone he was told that the flight had been through Italy to Africa and back through Spain, which showed the faith that the lecturer had in his machine.

MR. WIMPERIS, before asking Sqd.-Ldr. Probyn to reply, said there were a few remarks he himself would like to make. Sir Sefton Brancker had, he said, mentioned the panel which was investigating the question of noise in aircraft. The difficulties they had to face were very great, but he felt before long they would be able to show some tangible evidence of their work. The question resolved itself into two main sources of noise—the engine and the airscrew—and the trouble was that if you reduced the noise of one you apparently accentuated the noise from the other, and to further illustrate this point he said, that if you had two dogs both howling at, for example, a figure representing the intensity of howl as 40, then the resultant was a howl of 80, but if you shot one dog then the remaining howl still seemed to be 77 instead of going down to 40. It would be appreciated, therefore, that half measures were no good, and that they had to tackle both sources, but he thought that there was every chance of a reduction shortly which, when it had gone beyond the experimental stage, would be a godsend to private owners. He mentioned that the Westland Aircraft Works were now building another Hill-Pterodactyl with a cabin fuselage arranged with the pilot in front of two passengers who sat side-by-side, and the undercarriage would be of the single central wheel type.

SQD.-LDR. PROBYN, in replying to the question raised during the discussion, said that he entirely agreed with Mr. Butler as to the order of the points he made. As regards the long travel undercarriage he still felt that something on the lines of the Goodyear airwheel would be quite sufficient for normal pilots, but perhaps one ought to have a flexible undercarriage for instructional work. He could not agree that forward and downward were the most important views, as he felt that forward and upward were of more importance. The illustration he showed was a Delanne, a French machine which he had flown and found to be most nearly his ideal light aircraft. As could be seen, it was a low-wing monoplane with side-by-side seating in a cabin; from this machine the view was very good indeed. In reply to Sir Sefton Brancker he said that the cabin top on the Delanne was detachable so that, if necessary, one could pull a lever which released the top and allowed one to dive overboard in order to make use of a parachute—he was not told whether the top in flying off hit the fuselage or the tail! With regard to suitcases he found that normal ones just fitted his machine, and he could carry all the luggage that he could find room for. He did not know whether the pilot's assister would in time become a possibility for private owners, but it would be a good thing if it did; he had flown behind it, and it had worked with uncanny excellence. Plywood construction he had found entirely satisfactory, and repairs were able to be carried out easily in all countries. With reference to Capt. de Havillands contention that sociability was possible with the tandem arrangement, he could only say to Capt. de Havilland, Do you want your wife beside you in your car or behind you? The remarks about the coefficient of friction on wet grass were surely an argument in favour of his parachute scheme for braking. In reply to Dr. Merton he had always found panchromatic plates and a filter necessary when taking photographs from the air. Sqd.-Ldr. England said that he had found some difficulty abroad in taxying without brakes. He, the lecturer, would like to suggest that it would have been easier had Sqd.-Ldr. England's machine not been fitted with slots!

The idea of having two engines for small machines he could not agree with as one was quite enough to look after. His 10 plugs took nearly an hour to clean as it was, and 20 would require too much time.

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Canada Imports more American Aircraft

CANADA'S imports of aeroplanes from the United States during the first nine months of this year were 64 aeroplanes, valued at £126,234, compared with 62 planes, valued at £137,034, for the whole of 1928. Aircraft parts, valued at £137,786, were also imported from the United States during the nine months.

AIRISMS FROM THE FOUR WINDS

The Light Aeroplane Beats Other Means of Transport

MR. ALAN BUTLER and Mr. Nigel Norman very definitely showed that light aeroplanes can compete with all other means of transport when the occasion demands. Last Saturday they had booked seats for themselves and their wives to see the Carnera-Stribling fight, but when the time came for them to go over they found that no boats or air-liners were running across the Channel. After making sure that there were no other means at all they decided to go in their own Moths. They already had their seats in the train so they did not attempt to fly all the way to Paris but arranged to land at St. Inglevert and wirelessed ahead to arrange that the ground staff should be ready to help on landing.

On taking off they climbed to over 7,000 ft. so that there should be no danger of not reaching the coast in the event of engine failure and then went over with the following wind. The wind was such that they crossed at a ground speed of 160 m.p.h ! The staff were ready on the aerodrome and they landed with perfect safety and carried on to Paris by train.

Greek Air Ministry to be Formed

A BILL has been introduced in the Greek Chamber for the formation of an Air Ministry. The Bill provides that successive Prime Ministers will be *ex officio* Air Minister, and will be assisted by a responsible Under-Secretary and Ministry, who will control military and naval aviation, special attention being paid to the development of civil aviation, for which a separate section will be formed.

British High Commissioner Flies to Iraq

THE newly-appointed British High Commissioner for Iraq, Sir Francis Humphrys, with Lady Humphrys and a daughter, arrived in Baghdad on December 10. The party flew across the desert from Palestine in two troop-carrying aeroplanes, being escorted on the last stage of the journey by six smaller machines. The Emir Ghazi, the Crown Prince, welcomed Sir Francis on behalf of King Feisal at the aerodrome.

Capt. C. D. Barnard Married

CAPT. CHARLES DOUGLAS BARNARD, who piloted the Duchess of Bedford on her flight to India and back in eight days last August, was married on December 9, at Paddington register office to Mrs. Melita Erna May. Mr. A. Wallace-Barr was best man.

Sweden's Aerial Ambulance Work

" THE Flying Samaritans " is the title of honour bestowed on the heroic air ambulance pilots who have saved the lives of many persons who were dangerously ill in the isolated districts of northern Sweden. Amongst the hardships of the inhabitants of these distant and isolated settlements in the Lapland wilderness none is greater than the fear of being taken seriously ill without the possibility of obtaining medical assistance in time, and a number of lives have been lost owing to the lack of communications in these remote and lonely parts. This fear has now been dispelled thanks to the unique service of the Swedish Red Cross ambulance 'planes and their fearless pilots. These pilots are regarded almost as national heroes as a result of their unselfish and daring rescues, especially in cases of acute appendicitis, accidents involving severe loss of blood, dangerous epidemic cases, etc. This service has proved a godsend to the dwellers of the northern wilds. Large and fully equipped ambulance 'planes are now stationed at the military garrison of Boden in Lapland, at Froesoen in the northern province of Jemtland, and in Stockholm for serving the remote islands of the archipelago surrounding the inlet at the Swedish capital.

The Arctic Air Rescue

COL. MCALPINE, the Canadian mineowner, and his companions, who were missing for several weeks after they had set out on an aerial mining survey early in September, and were eventually located by searching aeroplanes, have now returned to the nearest railway outpost in Northern Manitoba. The return to civilization, which was effected by air in machines equipped with skis, across over 1,000 miles of barren land, occupied about six weeks, and severe snow blizzards and low temperatures made the "going" very hard. Col. McAlpine's two machines, and two of the searching aeroplanes, had to be abandoned in the Arctic.

Airship Developments in America

THE Secretary of the United States Navy has recommended to Congress the establishment of a naval dirigible base on the Pacific Coast at Camp Kearney, near San Diego, California.

A Branch of the National City Bank of New York has been opened in Buenos Aires and on the roof of the new building an airship beacon with a beam of 350,000,000 candle-power is to be mounted. It will be the first modern airship beacon to be erected in South America. On a clear night the beam will be visible for a distance of 100 miles.

Aeroplane Patents

THE Junkers Aeroplane Company announces that it is suing the American Ford Company for infringements of patent rights. The ground is that the Ford Company is building all-metal aeroplanes which are very similar to the Junkers machines, and which are, it is alleged, obviously a violation of international patent laws. The Spanish authorities at Seville have seized an all-metal Ford aeroplane, purchased by a Spanish aviation company, at the request of the Berlin courts.

U.S. Aeroplanes for China

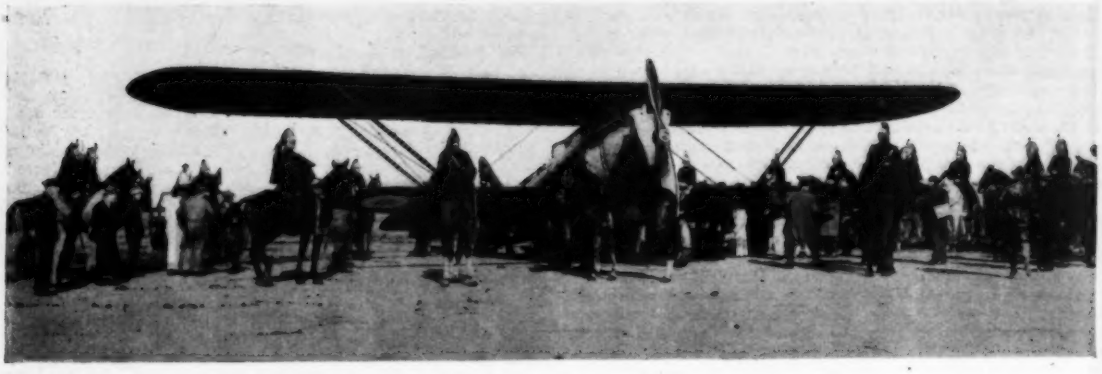
THE Chance Vought Corporation, a subsidiary of the United Aircraft Corporation, is delivering to the Chinese Government 12 high-speed biplane bombers of the type known as the Vought Corsair, which is used as the standard observation and attack machine by the United States Navy and was supplied by the same company to the United States Marines in Nicaragua, and to the Mexican Government during the Escobar revolt.

Handley-Page Slots for Royal Canadian Air Force

THE Royal Canadian Air Force has adopted the British slotted wing aeroplane safety device, and will fit it to all its machines.

THE R.A.F. AT WESTLANDS: A group of officers from Henlow who were shown the home of the Wapiti and Westland IV recently. Flt.-Lt. Paget and F/O Brunton, who are test pilots to the WestlandAircraft Co., are on the right hand edge and third from the right of the photo.

AIR TRANSPORT



Costes and Bellonte arriving at Le Bourget, November 21, 1929.

FRENCH LONG-DISTANCE FLIGHTS

THE Contest Committee of the Federation Aeronautique Internationale announced on Friday, November 29, that they had "homologued" (approved) the new World's Long Distance Record, of 7,905 km. (4,940 miles) for a continuous flight in a straight line, which has been made by Coste and Bellonte from Paris to He-Louang-Kiang, a small village, 50 miles to the north of Tsitsikar in Manchuria.

After remaining two weeks here, due to discussions with the Chinese authorities, about their lack of passports, Coste and Bellonte took off for Moukden, 800 kms. (500 miles) distant, which they reached in a single flight. They remained there 5 days and then flew to Shanghai, over the Yellow Sea, a distance of 1,500 kms. (900 miles), where they remained two days.

Another flight of 2,100 kms. (1,300 miles) brought them to Hanoi on October 23, where Costes decided to await the period of the November full moon. They "took off" from Hanoi, November 17, at 7 a.m. (local time), arriving at Le Bourget on Thursday, November 21, at 11.35 a.m. They covered the distance of Hanoi-Paris by the following stages:—

	kms.
Hanoi-Calcutta ..	2,200
Calcutta-Karachi ..	2,350
Karachi-Aleppo ..	4,000
Aleppo-Athens ..	1,400
Athens-Rome ..	1,100
Rome-Paris	1,150
	11,150

(6,350 miles)

in 4 days, 11 hrs. and 30 mins. They thus bettered the previous record for this distance, made by Costes and Le Brix last year, by some 6 hrs.

It is interesting to note, that owing to his desire to carry as much fuel as possible, Costes did not carry any spare parts whatsoever, for 'plane or engine. There was no stock of suitable "spare parts" at any of the landings. It was, therefore without a single overhaul or repairs of any kind that both the engine and the 'plane effected this long trip.

The total flight, out and return, was 26,000 kms. (16,250 miles).

Costes on the right and Bellonte on the left in front of their record-breaking "Breguet."

France-Madagascar Flights

After making the homeward bound trip of 13,000 kms. (7,800 miles) from Tanarive, Madagascar, to Paris in 7½ days, the French airmen, Bailly, Reginensi and Marsot landed at the Le Bourget airport at 4 p.m., Wednesday, November 20.

Flying the small Farman cabin monoplane F.190, equipped with a "Jupiter Titan" 230 h.p. engine, the airmen left Paris, October 28, last, and landed in Tanarive, Madagascar, on November 5, thus making the outward-bound trip in eight days. Their daily flights were as follows:—

France—Madagascar

		kms.
October.		
28	Paris—Oran	1,500
29	Oran—Reggan	1,200
30	Reggan—Niamey	1,650
31	Niamey—Fort Lamy	1,550
November.		
1	Fort Lamy—Bangui	1,200
2	Bangui—Luluabourg	1,300
3	Luluabourg—Br. Hill	1,400
4	Br. Hill—Quilimane	1,000
5	Quilimane—Tanarive	1,600

Madagascar—France

		kms.
Nov.		
12	Tanarive—Quilimane ..	1,600
13	Quilimane—Elisabethville	1,250
14	Elisabethville—Coquilharville	1,700
15	Coquilharville—Ft. Archambault	1,050
16	Ft. Archambault—Zinder	1,200
17	Zinder—Gao	1,200
18	Gao—Adrar	1,300
19	Adrar—Carthagena ..	1,600
20	Carthagena—Paris ..	1,500

Total, 24,800 kms. (15,500 miles).

Hours of flying, each way, 90.

The fast mail steamers take about a month and a half each way to make this trip.

This flight was privately financed by Andre Bailly, of Nancy. He was accompanied by Jean Reginensi, a chief adjutant, and Jacques Marsot, a mechanic of the 34 Aviation Regiment of le Bourget, who had obtained leave in order to make the flight.

The airmen were warmly welcomed by a large crowd on landing at le Bourget, among whom were several high Government officials.

On their arrival at le Bourget, Bailly and Reginensi stated that they had had high winds and storms, practically all the way. Marsot, the mechanic, declared that the plane and motor had functioned perfectly, neither needing any repair or overhauling since leaving Paris.

M. Laurent Eynac in his speech of welcome, after warmly complimenting the airmen, announced that Bailly and Reginensi would be named 2nd Lieutenants in the Officers Reserve Corps and that Marsot would receive the Legion of Honor decoration. He declared that the postal air route to Central Africa as far as the Congo would be opened in 1930 and that it would extend to Madagascar in 1931.

A batch of Farman F 190's, used on the French flights between France and Madagascar.

The Farman cabin monoplane, F 190, used by Bailly and Reginensi, had already served on a number of other long-distance flights this year. Notable among these were the Paris-Saigon, Indo-China, flight of 15,000 km. (9,500 miles) of last April made also by Bailly and Reginensi and that of Paul Louis Richard, the French Aeronautical Engineer, who made preliminary surveys last spring of this Trans-African Air Route, and the France-Madagascar flights of Bourgeois, Goulette and Marchesseau. R. C. W.

The England India Air Mail

THE air mails for India, which left Croydon on November 30 and were involved in a forced landing near Frankfort, reached Athens, by rail, on December 4. They were then despatched by flying-boat to Alexandria and reached Bushire on December 8, and Karachi on December 10. They were thus three days late, which means that those for Bombay will not be received until December 13, the same time as the ordinary mails. While Imperial Airways should have every sympathy for their recent run of bad luck on the India route, this state of affairs is very unsatisfactory. So much so that Messrs. Tata and Sons, Ltd., the well-known Parsi engineering firm, have approached the Government of India with concrete proposals for the establishment of an air service from Karachi to Bombay, in order to connect with the the Indian air mail from Croydon. They have received only a formal acknowledgment, but should the Government of India grant them the necessary contract, they propose to make early arrangements to purchase machines and equipment in order to start the service as soon as the Juhu Aerodrome is serviceable in October, after the next monsoon. Messrs. Tata have a reputation for seeing any scheme or contact of theirs through to the end, so this addition to the England-India route will probably materialise.

Sir Alan Cobham's D.H. 50

THE D.H. 50 biplane on which Sir Alan Cobham made his historic England-Australia-England and other flights is now seeing service in Australia. Western Australian Airways, Ltd., brought the fuselage from the de Havilland Co. and had it sent to Perth, where main planes, tail surfaces, and under-carriage were manufactured and fitted at their Maylands workshops. Fitted with a "Nimbus" engine—which is standard on the North-West service—the machine has a top speed under test of 126 m.p.h. After taking part in the Sydney-Perth Air Contest, this machine was placed in commission as a unit of the North-West fleet.

Imperial Airways in S. Africa

GERMISTON, in the Transvaal, has been selected by the Imperial Airways Company as its central airport in South Africa. The South African Government is granting a £400,000 subsidy, spread over five years, for Imperial Airways forthcoming Cairo-Cape service. It has also undertaken to provide landing places and a network of wireless stations from Salisbury to the Cape for communication with mail 'planes. A site for the aerodrome at Cape Town has been selected and work is being started at once.

Sir Alan Cobham left Croydon, on December 10, on the first stage of his flight to Kenya and South Africa, to survey the route for a regular London-Cape Town air service, and landed at Dijon, 3.30 p.m. In Africa, he will be joined by an Imperial Airways survey party, which will co-operate with him in choosing landing grounds and organising service facilities.

Manchester and Chat Moss Aerodrome

A DIRECT air service from Manchester to the Continent next summer was foreshadowed at a luncheon which was given in the Town Hall by the Lord Mayor to Sir Sefton Brancker, Director of Civil Aviation, after he had inspected the new Manchester airport at Chat Moss on December 3. Sir Sefton Brancker took an optimistic view of the future of municipal aviation. "Regular services," he said, "are bound to be developed between Manchester and other places, and one of the first services which I can see being developed is one from Northern Ireland to Manchester, then to the Continent *via* Hull. It is easy to imagine what a direct service between Manchester and the Continent will mean to the business houses who have interests abroad."

Sir Sefton said he regarded Manchester's lead to the country as a very courageous one.

Saint Hubert Airport

STEADY progress is being made in the development of the Saint Hubert Airport and airship base. When finished it will be one of the best-equipped airports in the world. During the past year, the construction of permanent hangars was completed, and progress was made in grading, drainage, roads, water supply, &c. Equipment to facilitate night flying has been installed. A radio station has been erected, and weather reports are being received regularly. On the airdrome stands the steel mooring tower, which is in readiness for the reception of the British airship "R 100," when it makes its first Transatlantic flight. The tower was erected by Canadian Vickers, and has been equipped with a silicol hydrogen gas plant, which will enable the dirigible to replenish its gas bags.

Another Luft Hansa Flight

IN pursuance of its plans for developing long-distance and Transatlantic mail services, the German Lufthansa has carried out an experimental flight from the Spanish coast to the Canaries. The pilots, Herren von Schröder, Albrecht, and Eichentopf, used the same machine, an Arado V-I passenger monoplane (500 h.p. B.M.W. Hornet engine), with which they made their flights to Seville and Constantinople. They left Seville early on Friday, December 6, and landed near Santa Cruz, Teneriffe, 10 hrs. later.

More New Zealand Money in Aviation

ANOTHER commercial aviation company, the Dominion Air Lines, Ltd., with a capital of £200,000, has been registered in Wellington, New Zealand.

SOME NOTES ON THE TECHNICAL PROBLEMS OF CANADIAN AVIATION

By SQUADRON-LEADER. D. C. M. HUME, R.C.A.F.

THE above was the subject of a most interesting lecture delivered by Sqd.-Ldr. D. C. M. Hume, R.C.A.F., before the Westland Aircraft Society, the Yeovil branch of the Royal Aeronautical Society at Yeovil, on Friday, November 15, 1929.

Sqd.-Ldr. Hume, who was introduced by Mr. R. A. Bruce, president of the Society and managing director of the Westland Aircraft Works, said he wished it to be quite clear that any views he might express were his private opinions and were not necessarily shared by the Service.

He first gave a brief but concise geographical survey of Canada, and showed that for all practical purposes the country could be divided into four main belts: the first from the West Coast to the Rockies, the second from the Rockies to the Middle West or Winnipeg district, the third from the Middle West to the Maritime Provinces, and the fourth the great North-West area, including the Yukon and the barren wastes. In order to obtain a rough idea of the extent of the country, it could be considered as approximately 3,000 miles wide and 1,000 miles from north to south, while the enormous size of the inland water surfaces could be judged from the fact that the whole of England could be placed in Lake Superior.

The climates prevailing in the several divisions were in the case of the western belt, super-English; that is, there was a fair proportion of rain and sun and considerable humidity for the best part of the year. In the central prairie district the climate was dry, the country was bald and windy, and there were great variations in climate. There was a seasonal temperature difference of from 90° F. to minus 30° F. The Eastern sector was also subject to a wide temperature swing with the seasons. The land was mostly fertile, the humidity was high, but not so high as in the west.

As to the natural resources of the country, the western district was well supplied with minerals and was very good timber country. The centre district, with its intensity of change from season to season, was ideal for cereals, while the east produced much timber for wood pulp and was well up in minerals; to the north was a vast deposit of bituminous sand as yet entirely undeveloped, which eventually might yield vast quantities of petroleum, etc. Of the north-west the bulk was largely unknown, but it was thought to be well stocked with minerals. A very short summer of only two months' duration was experienced in this district.

After this brief introduction, which enabled the audience to follow more keenly the lecturer's points which were to follow, Sqd.-Ldr. Hume then passed on to a consideration of how aircraft were utilised in Canada at the present time. In the west, aircraft were used for fish preservation, the patrol having a good moral effect on the practice of illicit fishing. For fish propagation—it being remembered that salmon production formed one of the chief industries of the country—the fish spawn were taken from the Government salmon hatcheries and distributed wherever there was a shortage. Forest fire patrol was also carried on, while there was also a certain amount of air survey and air mail activities. The air mail was merely a natural sequel to the other flying and was really a secondary activity to the first-named services.

In the middle section there was air survey, the dusting of crops and prospecting for minerals, and the air mail.

In the east, timber cruising was becoming an important feature. This was formerly done by canoe or on foot, and was carried out to discover the extent and varieties of timber in various areas. By flying at 4,000 ft. it was possible to form an excellent estimate of the quality and distribution of the various kinds of timber from the air in a fraction of the time taken by the old method. Forest fire patrol was also important, while prospecting, passenger flying, and air mail also claimed a certain amount of attention.

In the great northern section there was little beyond prospecting and mapping at present. The mapping of Canada was not half completed, and at the present time there were vast areas north of the Canadian Pacific Railway which were mostly blanks on the map, but which after air survey were found to be covered with rivers, lakes, and small islands, etc. In 1928 the Royal Canadian Air Force took over the whole of the mapping work, and some 64,400 square miles were mapped in that year. The Topographical Survey Department of Ottawa had on their files no less than a quarter of a million photographs from this source.

Sqd.-Ldr. Hume emphasised the importance of the forest fire patrol. Wood pulp formed one of the largest industries of the country. Canada was one of the largest producers of paper, supplying both Europe and the United States. Wood alcohol was manufactured also. The soft woods were the ones that were used, and the trees grow quickly and burn quickly. Fires started from any of a number of causes, could be killed when still small fires by ringing round, by felling, or by pitching the fire towards water. If the fire had got a large hold, however, nothing but a change of wind or fall of rain would do anything to stop it. It was therefore very important to get fire fighters on the scene while the fire was yet young.

Consideration of these activities showed that the position of Canada, from a flying point of view, was unique. There was no question of educating the people and of getting them airminded, as in this country aviation was already an accepted fact, and the work was already there, waiting to be carried out. The use of aircraft in the various ways already enumerated had shown the great advantages of the new method of transport, and aviation was firmly established with a sure future.

The Royal Canadian Air Force was divided into two sections, the military side, which was actually the least obvious of the two, and which was kept in step with the Royal Air Force as far as developments in equipment, etc., were concerned, and secondly, the Civil Government Air Operations Section, which carried out Government work for other Government departments by means of aircraft.

It was necessary to adapt the aircraft of the country, firstly, to suit the conditions of the country and the climate, which conditions were common to both the military and the civil side, and secondly, to meet any special conditions consequent upon the special occupations in which the aircraft were engaged; these conditions were particular to the civil side.

Considering the effect of the climate on the aircraft, taking first the air frame, Sqd.-Ldr. Hume said that the seasonal variations produced in wooden and mixed structures a severe change in size; such a change may be brought about by merely moving the aircraft from one part of the country to another, where conditions might be totally different. As an instance, in one case where wooden wings had been made of specially-seasoned timber, the shrinkage of the spars had been so great that all the ribs had broken. The lecturer mentioned that the method of seasoning spruce adopted was to season for two years in the open air, protected from the worst of the weather, and then for one year indoors, where the conditions, humidity, temperature, etc., were under control.

Another trouble experienced was the forming of blue stain, a form of bacteriological fungi on the wood and also on glues, especially in the case of seaplanes, where the cultural conditions were evidently favourable to the formation of this trouble. As far as doping was concerned, they had found nothing deleterious to the dopes used, nitro-cellulose dope being standard. Rubber was found to be of no use in the extremes of climate. They had experienced no evidence of fatigue in metals due to the extreme cold, a point about which there were often questions raised. Analysing these results, it was clear that an all-metal machine, of very sturdy design, was called for. Aircraft in Canada was subjected to rough usage, and it was necessary to be able to carry out structural repairs with as much facility as possible. The "Meccano" principle of construction, in which members could be easily replaced, was an ideal to be aimed at.

Coming to the question of engines, before efficient air-cooled engines were available, water-cooled engines had to be used, and these gave rise to obvious difficulties in connection with the cold in winter. While freezing was experienced on the one hand, large-sized radiators had to be carried for use in the heat of summer. In winter time, the use of the water-cooled engine meant draining the water system and refilling every time, or else some means had to be adopted for keeping the engine and water from freezing up. The method favoured most was a combination of a special mixture, consisting of 40 per cent. wood alcohol, with 60 per cent.

water. The difficulty of evaporation loss has been solved in a very simple manner. The pipe from the radiator outlet had been taken to a small vessel, which was provided with cooling coils, with the result that the vapour condensed and could be led back to the system again. By this means, not more than 5 per cent. loss of alcohol occurred during the season. As to lubricating oils, they had found that a mixture of five parts of Arctic to three parts of B.B. Mobiloil had proved satisfactory for the coldest weather, while a mixture of 50-50 had been satisfactory for temperatures down to 5° F. By intelligent mixing in this way, they had been able to eliminate lubricating oil troubles. It was necessary to have the oil pipes and oil tank, which were in the slip-stream, lagged with asbestos, or some similar material, to prevent undue cooling.

Cold-weather starting presented many problems, but they had been able to reduce these to a simple matter of routine. This was briefly as follows:—The engine was first doped with about half a pint of petrol; this was for the purpose of easing up the engine, the petrol acting as an oil solvent rather than as a dope. In the case of water-cooled engines, of course, the water should have been previously drained to avoid cracking troubles and water pumps freezing up, etc. The engine was next doped with about a quarter of a pint of petrol-ether mixture in the petrol intake manifold. Finally, the engine was again doped with a quarter of a pint of petrol-ether mixture, and the engine should then start in the ordinary way, after which it should pick up and run on petrol. They had found by experiment that this process needed a certain amount of watching on small points; for instance, the priming nozzles had to be of sufficient size, or they would freeze up. Actually, a grease-gun of 1½ in. diameter and 7-in. stroke had been used. The quantity of dope was important, as too much or too little prevented an easy start. Starting in temperatures of 20° F. and over was found possible with a straight petrol dope. From temperatures of 20° down to 0°, a mixture of three parts of petrol to one of ether had been found suitable. From 0° down to minus 15° F., equal parts of petrol and ether had been used, while from minus 15° F. to minus 30° F., or thereabouts, experienced in the worst of the cold districts, pure ether was used. During these operations, the throttle had been set at about one-fifth opening.

Coming to the starting of air-cooled engines, such as the Whirlwind, they had evolved a simple system consisting of an asbestos bag, which was fitted right over the engine, and which was provided with a trunk tube which led down to a length of stove pipe at the end of which was fitted some fine gauze. Into the end of this stove pipe, which had an elbow, were directed the flames from two normal-type petrol blow lamps for half an hour. Hot gases were thus made to circulate round the whole of the engine, and with the use of warmed oil, a start could be effected. It had been found possible, in a "Siskin," at a temperature of 5° F., to effect a normal start by turning the engine round for six times after doping. A start could be made by the use of a hot brick, held near the mouth of the air intake, and ether could be sprinkled on the brick.

Coming to the question of fuels for engines where high compression was used, petrol-benzol mixture was of no use whatever, as the benzol separates out in the cold and also the benzol vapour forms a species of snow and blocks up the various passages. The substance used was an ethyl compound (tetro-ethyl-lead) and 5 c.c. of ethyl compound had been used to a gallon of petrol, later reduced to 3 c.c. per gallon. The only trouble experienced as a result of the use of this ethyl mixture was the pitting of aluminium bronze valve seats. The mixture seemed to eat right into the metal and in order to get over this difficulty the valve seats had been replaced by special seats of K.E. steel which proved satisfactory.

A point which had to be watched in connection with engines was that whenever an engine was shut down for any time internal condensation took place and it was necessary to remove all the plugs and dry them.

So far the various points had all dealt with the mechanical side, and Sqd.-Leader Hume then led on to some difficulties which were peculiar to the flying side.

It had been found that it was essential that hinges and controls should not be exposed. Particularly during the half-seasons and especially in seaplanes, such exposed parts were liable to be frozen up solid and all controls locked. The machine might be covered with moisture due to flying through a snow storm, and become covered with ice, which would cause trouble with the controls. Greasing helped to a certain extent but it was essential that the movable portions of the controls should be so arranged that they were not exposed in this way.

The general design of the machine must provide for getting off and alighting on comparatively small spaces. In summer, the seaplanes may have to alight on any convenient small lake, the banks of which were often timbered with 40 ft. trees which naturally reduced the available area considerably. A snappy get-off was essential under such conditions. Sturdiness of construction was absolutely essential as a machine might be away for three months with only the crew to undertake any repairs or overhauls. One difficulty experienced with seaplane flying had been due to striking submerged logs. Some of the logs sent down the rivers got water-logged and floated a little under the surface where it was impossible to see them; several hulls had been holed in this way. For alighting in winter wheels were of no use except on glare ice or packed snow. On soft dry snow, skis were the only method. The ordinary type of undercarriage was more or less suitable; the legs should be of the oleo type and the oil used one that sets at a low temperature. A suitable mixture had been found to be 20 per cent. paraffin (called in Canada coal oil) and 80 per cent. Mobiloil A.

Sqd.-Ldr. Hume then traced the evolution of the skis. The skis now used consisted of laminated planks of ash faced with twelve gauge duralumin; they were supported on an arrangement of tubing encased in a form of pot. The skis must be made interchangeable with wheels and a quick change-over was necessary as a machine might be landing on snow in one flight and grass in the next. In order to obviate the changing over process special wheel skis had been designed, but had not met with much success. The wheel was fitted in a slot of the skis, and was nearly always choked up with solid snow. It had been found necessary to face the skis with metal on account of rocks embedded in the snow which ripped up the wooden skis. All-metal skis had been tried, and they could be made quite light, but were subject to damage due to rocks and hard lumps on landing and needed the backing up of the wood. Skis with corrugated undersides had been tried out and it had at first been thought that the corrugations would prevent side slipping. The theory was wrong, however, as a certain amount of side slip was absolutely necessary when landing, and the corrugated surface presented more area for contact with the snow, and required more breaking out after freezing in. Sqd.-Leader Hume mentioned that the design of skis had been dealt with in two papers which had been given before the Royal Aeronautical Society, and which could be referred to for further details. A suitable specification for the skis for a 5,000-lb. machine would have a loading of some 200 lb. per sq. ft. with a cross sectional area of saucer form, that is with a flat bottom and slightly turned-up sides. These turn-ups are necessary as the skis move sideways and the rounded edges enable them to ride up on the snow. The bottom of the skis were flat and metal covered, the front being turned up; the rear end should also be turned up to facilitate the man-handling of the machine as skis cut off square at the back dug into the snow when the machine was pulled backwards. The skis should not weigh more than some 90 lb. each which was the weight as at present constructed.

Some method was necessary of restraining the movement of the skis in the air. A normal angle of plus 2° to the chord of the wings was suitable and the first method used was by a cable fore-and-aft with rubber insertions. Later telescopic legs were fitted, these legs being spring loaded, but they were rather fragile and easily bent if roughly handled. The latest and best method was the fitting of axle springs which could be placed inside the fairings of the ski supports and added no head resistance.

In landing an aeroplane on skis a somewhat similar problem was presented to that found in the "human" type of skis and the weight must come behind the centre of side resistance. It has been found that the height of the ski pot, *i.e.*, from the axle to the bottom of the ski should equal the length of the ski behind the axle. An aspect ratio of 5 to 1 had been found satisfactory, and as mentioned above the resultant of the weight line must fall behind the centre of side resistance.

Another matter to be considered in practical flying in Canada was the necessity for robust mooring arrangements, anchor rings, etc. The easiest and most satisfactory method of mooring aircraft in snow was to take an ordinary sand bag, tie it round the middle with a length of line, dig a hole in the snow and lay the sand bag in. Some water was poured in and the hole then filled in with snow and the machine anchored to the line. The anchor froze in so solidly that the line had to be cut to release the machine.

Although so much had been said about winter conditions, Sqd.-Ldr. Hume wished to point out that it is not all winter flying in Canada, and summer flying was carried out in hot fine weather, which however gave rise to no very particular difficulties.

He would like to offer some suggestions regarding the design of a machine for special duties in Canada, one of which concerned the question of standards. He advised the use of the S.A.E. standards of the U.S.A. for screw threads, etc., as they could obtain supplies of spares from America " over the counter," as it were, within five days, whereas it took five weeks to get anything from England. As he had already mentioned, floats had to be extremely sturdy, and amphibious gear would be useful, and this would reduce the time in getting the machine out of the water. A simple arrangement was the removable axle which could be passed through the float for landing purposes. At the bases they could use a trolley with pneumatic-tyred wheels or a small trolley for each float or axle.

The dusting of crops for such purposes as the eradication of white pine blister rust had been satisfactorily accomplished, but a peculiar difficulty had arisen in connection with duralumin. Severe corrosion had occurred in a machine in the Halifax station as in half a season the floats had been badly pock-marked, and in some cases the holes were right through. This was thought to be due to chemical action taking place due to the calcium arsenite or sulphur used for the dusting, in conjunction with salt water. The latest development in this connection was the fitting of Alclad floats, the lecturer did not know with what results.

The use of the Inertia starter was to be encouraged, as this was an extremely useful instrument. The combination wheel-ski was a device which needed further experiment.

Some of the prime requirements of the Canadian aircraft of the immediate future included the following points :—

The machine must be suitable for taking vertical and oblique photographs for aerial survey. It should be a three-seater machine for pilot, photographer and navigator, with a good view for each. It should carry 1,000 lbs. of payload and should be a sea, land and snow 'plane equally. It must be remembered that there were no hangar facilities except at the bases. It should be fitted with an air-cooled engine and a metal propeller, preferably of the split boss type. This type of propeller with blades of duralumin was favoured, as it was possible by setting the blades to reduce the number of spares which had to be kept in stock. As an instance of this, it was found possible for blades of the same plan form to be used to give two entirely different settings, and thus the number of spares necessary was reduced from four to two in this case. The machine should be of all-metal construction, simple and robust, and possess a service ceiling of 15,000 ft. as a seaplane.

Sqd.-Ldr. Hume then showed a series of slides, showing the various machines in use, including the Vedette, and the Fairchild F.C.2 cabin monoplane, a machine which had proved good for photographic purposes. A slide was shown illustrating the method of mapping employed, with the use of the perspective grid. Photographs were taken with oblique perspective, and including key points a known distance apart. The corresponding celluloid grid was then applied to the photograph, and it was a comparatively easy matter to scale up the distances from the perspective photograph to a true plan. This method was, of course, only suitable for use in flat country, and flying was usually carried out at 5,000 ft. For vertical photography a height of 10,000 ft. was used. Some further slides showed the types of country flown over, including some very spectacular views in the Rockies.

The meeting was then thrown open for discussion. Mr. Johnson asked whether the lecturer could give any details of special personal equipment carried. Sqd.-Ldr. Hume replied that face masks were not used as closed machines were essential for winter flying. Fleece-lined equipment was used, and in addition a game getter's gun of 0·22 bore and fishing lines were carried. Fire-fighting equipment was also carried as a rule.

Mr. Brigham asked whether trouble had been experienced with plywood. The lecturer replied that most of the plywood came from England as it was not made to any extent in Canada, and that the same tests applied therefore as here. Care had to be taken not to get the plywood soaked with water or freezing and disintegration would take place.

Capt. Hill asked what type of anchor was necessary for use with seaplanes, and Sqd.-Ldr. Hume replied that for the most part it was possible to beach the machines as the lakes shelved quite sharply. They could be anchored to trees on the shore quite easily in most cases. Incidentally, the fact was mentioned that the lakes water was for the most part drinkable, and caused no corrosion. Capt. Hill further asked whether the air temperature dropped off with height in the same ratio as it does in England, and he was informed that the same laws held good.

Mr. Gibson asked whether any trouble had been experienced with the Fokker three-ply covered wings. Sqd.-Ldr. Hume said that the wings apparently functioned all right, but they had no machines of this type in the Service, and he could not speak from experience. In the south he understood that trouble had been experienced through fungus growth. Mr. Gibson further enquired whether any cylinder scoring had been experienced, due to the lubricating oil being washed out by the excessive doping at starting. The lecturer replied that no scoring had been found.

Replying to Mr. Davenport the lecturer said that the chief difficulty in landing on smooth ice was due to the skating action with nothing to stop the machine. The chief danger was due to the broken surface of the ice. Mr. Davenport further asked whether cockpit heating was used, and Sqd.-Ldr. Hume replied that exhaust heating was regularly used. They did not use electrically-heated clothing as, for one thing, they did not wish to carry the necessary batteries. He pointed out that the machines used for winter flying were not the same as the ones used in summer, and this simplified the problem somewhat as the machines could be specially adapted for the seasonal requirements.

Mr. R. A. Bruce enquired whether the windows of the enclosed machines had been found to coat with snow or ice until they became opaque. The lecturer replied that no such trouble had been experienced, and that a rub with a glycerine rag was all that had been found necessary to keep the windows clear. A certain amount of trouble had been found in landing on snow after a storm, due to the intense dazzle which was apt to give a false impression of height.

Mr. Gibson stated that in France they had found the use of amber goggles of great assistance in this connection. He would also like to ask whether glass or celluloid was used for the windows. Sqd.-Ldr. Hume replied that Triplex glass was always used, celluloid being of no use owing to oil discoloration, etc.

In closing the meeting, Mr. R. A. Bruce said that they had come to the meeting with extremely hazy ideas on Canadian flying conditions, but that Sqd.-Ldr. Hume's admirable lecture had dispelled the haze thereon. He mentioned that the Westland Aircraft Works had recently sent a machine to Canada, and much of the information which had been given by the lecturer would have been very valuable then. The actual inside knowledge from a man who had actually experienced the conditions was very valuable, and gave them a much better idea than any amount of reading could do.

The meeting closed with a very hearty vote of thanks to Sqd.-Ldr. Hume.

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WORLD'S RECORDS

THE Royal Aero Club has received advice from the Fédération Aéronautique Internationale that the following World's Records have been granted :—

Greatest Speed over 100 Kilometres.—Flying Officer H. R. D. Waghorn, A.F.C., on Supermarine-Rolls-Royce S.6, (Rolls-Royce " R "), on September 7, 1929.

330·1 *miles per hour* (531·260 *kilometres per hour*).

Flying Officer R. L. R. Atcherley, on Supermarine-Rolls-Royce S.6 (Rolls-Royce " R "), on September 7, 1929.

331·6 *miles per hour* (533·800 *kilometres per hour*).

World's Greatest Speed.—Flight Lieutenant G. H. Stainforth, on Gloster-Napier VI (Napier Lion VII D), on September 10, 1929.

336·3 *miles per hour* (541·100 *kilometres per hour*).

Squadron Leader A. H. Orlebar, A.F.C., on Supermarine-Rolls-Royce S.6 (Rolls-Royce " R "), on September 12,1929.

357·7 *miles per hour* (575·700 *kilometres per hour*).

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The Third Route

A LECTURE which none should miss will be given at the Wigmore Hall by Sir Phillip Sassoon, on December 20, at 3 p.m., in aid of the Royal Northern Hospital. Tickets, which may be obtained from the Secretary, 25, Park Lane, W.1, are 8*s.* 6*d.*, 5*s.* 9*d.*, reserved, and 2*s.* 4*d.* unreserved.

Sir Phillip will give an account of his journey to India and back, and will illustrate it with lantern slides.

CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

TAILPLANE POSITION

[2239] I should be much obliged if you would insert in your next number under "Correspondence" a reply which I should like to make to Mr. Desoutter's letter under No. 2225 therein under the heading "Tailplane Position."

Mr. Desoutter's letter conveys the impression that I perched my tailplane high up just for the fun of it.

The F.K.41 was primarily designed for foolproofness, and this high tail position was due to this. A design always must be a compromise, and I rather choose to lose 28 yards on the start than to have a machine which could, when started single-handed with too much throttle, nose over. The high tail position also gave no change in flying with engine on or off.

That my compromise was a good one was proved by the flying qualities and performance of my F.K.41 machine, which were such that Mr. Desoutter hastened to obtain the world licence (excepting Holland and its colonies) of it.

With regard to the last part of Mr. Desoutter's letter, which also conveys a wrong impression, I may say that of my 20 years' aeroplane building, 10 were spent in England, where I obtained, in the production of all-British Deperdussin machines (1911-13), all Armstrong-Whitworth machines (1913–17) and all B.A.T. aircraft, the necessary British practice which made the F.K.41 coupé such a success.

Having bought my licence, Mr. Desoutter is, of course, entitled to make any changes he likes and compromise in a different way, but his letter made me think of the little French tailor who, when I was once staying in Paris, had to make a repair to a dress suit of mine which hailed from one of the best-known West End tailors. On returning the suit to me, the little Frenchman insisted upon me trying it on, and thereby had the manners and pulled a face as if he had made the suit himself.

FREDERICK KOOLHOVEN

Rotterdam,
December 2, 1929.

AVIATION OLD-TIMERS

[2240] With reference to the above letter in your issue of November 29, may I suggest an alternative to an "Old Timers" number, whilst I have no doubt that such a number would be of great interest, would not the many fine achievements and photographs of the early pioneers with their machines fill several such numbers?

Perhaps as an alternative, a weekly supplement or a page or two of FLIGHT could be devoted to early reminiscences and pictures, reproduced from the first number of FLIGHT onwards.

I write this thinking that there may be others like myself, who although now taking a great interest in flying (unfortunately, not a practical one), were rather too young to remember or possess journals of the first years of aviation, and that the above suggestion would fill the gap by providing an illustrated résumé of the history of flying from the beginning.

Lavenham, Suffolk. H. F. BAKER
December 4, 1929.

[2241]. I read with interest your correspondents' suggestion regarding a special issue of FLIGHT, devoted to reminiscences of "Old Hands," and in response to your appeal for readers' views I take this opportunity of advancing my personal suggestion.

In the first place, it would appear a somewhat lengthy, not to say, difficult, business to collect sufficient material to devote to a special issue of FLIGHT, but I think it would be excellent if you could set aside a few columns each week for that purpose, as in the case of the attractive feature "Private Flying."

If it were possible to supplement such history by publication of FLIGHT photographs of early machines, interest would be further enhanced and readers would be afforded a relapse into those romantic pioneer days.

Romford, H. S. ELLINGWORTH
December 3, 1929. (ex R.A.F.)

WEIGHT OF AIRSHIPS

[2242] May I, as a former airship designer, point out an apparent mistake in the design of our two latest airships, R 100 and R 101. These airships have both turned out heavier than the Zeppelin type of airship of the same volume. The structural weight of R 100 (excluding engines) is 92 tons, whilst that of R 101 is 103 tons; an airship of the Zeppelin design of the same volume would have a structural weight of 70 tons, including weight of accommodation for 100 passengers.

The reason for this large increase in structural weight appears to be due to the low ratio of length to diameter which was chosen for these ships. The length-diameter ratio of former airships varied between 7·1 and 10·4, whilst that of R 100 and R 101 is as low as 5·5. On examining the weight and stresses of former successful airships, and increasing these by the principle of similarity, I find that such a low length-diameter ratio has caused a large increase in the structural weight.

The stresses in an airship structure are due to two main causes:—(1) Stresses due to gas pressure and (2) stresses due to wind pressure. The former are tending to burst the structure whilst the latter are bending the hull as a beam. It can be proved that the gas pressure stresses increase with the cube of the diameter and are independent of the length, whilst the wind pressure stresses increase with the square of the length and are independent of the diameter. It follows from this that the weight of structure resisting gas pressure stresses will increase with the $(\text{diameter})^4$, whilst the weight of that part of the structure resisting wind pressure stresses will increase with the $(\text{length})^3$. Hence, a lighter structure can be obtained by increasing the length rather than by increasing the diameter. In the case of R 100 and R 101, the increase of volume over former airships was mainly obtained by increasing the diameter; this has made these ships very heavy and consequently reduced their range.

I have applied the principle of similarity to the weights of R 36, a former British airship which had a length-diameter ratio of 8·6. I have increased the volume of this ship to that of R 100, firstly, by keeping the length-diameter ratio as 8·6, secondly, by making the ratio the same as R 100, that is, 5·5. I find that the latter ratio adds 26 tons to the structural weight more than the former, for the same volume ship. This would account for the whole of the excess weight of R 100 over the Zeppelin type. The fact that R 101 is 11 tons heavier than R 100 is probably due to the type of structure used in the latter ship; several departures from Zeppelin practice have been made in R 101 which appear to have increased the weight.

The flying tests of R 101 showed a low cruising speed for the horse-power used; evidently the low length-diameter ratio has also increased the resistance of the ship.

It is unfortunate that such a low-length-diameter ratio was chosen in the design of these new airships, as it has reduced their range to such an extent that they are useless for the purpose for which they were designed.

I would like to add that the structural weight of R 100 is a little less than what would be expected for the low value of length-diameter ratio chosen. The design of this ship compares very favourably with that of the latest Zeppelins.

South Kensington, S.W.7. E. H. LEWITT

A GRIEVANCE

[2243] As head of our best "Air-journal" I would like to address this grievance to your notice. I am an ex R.A.F. mechanic L.A.C. Air Gunner. Since leaving the service I have qualified for Pilot's "A" Licence. My numerous letters to the various heads of aircraft firms have not even been answered. Club flying to a man of my limited means is more or less impossible. My point is this:—We are continuously being told by Lord "This" and "Sir That" that we simply must become air-minded. There is not the slightest doubt that flying in this country is being kept for the man with the money and public school education. Chaps like myself, who have flown hundreds of hours at their country's expense and incidentally survived a bad crash, scrape enough cash together to qualify for "A" Licence, are, I should say, just about as air-minded as one could be. In the event of war we would be expected to go as pilots. Why then doesn't the Air Ministry give us some encouragement in the form of, say, flying up to 50 hours in the year? I know that up here if that was the case we would require more air space.

Personally, I am ready to go anywhere in the flying line if chance offers—but none offers!!

ARTHUR CROSSE
(Late R.A.F. Eastern Units)

Fenham, N.C.-on-Tyne.
November 29, 1929.

IN PARLIAMENT

Scotland and Army, Navy and Air Force Entrance Examinations

MR. E. BROWN, on December 3, asked the Secretary of State for Scotland whether the leaving certificate issued by the Scottish Education Department and the day schools (higher) certificate are accepted as equivalent to the eight school certificates for the purposes of admission to the Army, Navy and Air Force entrance examinations?

Mr. Adamson: The Regulations for the Army, Navy and Air Force entrance examination provide for the acceptance, in the case of a candidate educated in Scotland, of a certificate from the Scottish Education Department showing that the candidate has attained a standard equivalent to that of the school certificate of the Oxford and Cambridge Schools Examination Board. The Department would normally have no difficulty in issuing this "certificate of equivalent attainment" to the holder of a leaving certificate. The possession of a day school certificate (higher) would not, in itself, be regarded as evidence that the pupil had reached the necessary standard.

Overhead Wires and Aerodromes

MR. EVERARD asked the Postmaster-General whether he will arrange that all telegraph and telephone wires adjoining the aerodromes of municipalities and light aeroplane clubs shall be put underground?

Mr. Lees-Smith: I am always willing to make the best arrangements practicable for diverting to underground, or to another route, overhead telegraph and telephone wires in the vicinity of aerodromes, provided that the owners of the aerodromes will bear the expense.

Light Aeroplane Clubs

MR. EVERARD, on December 4, asked the Under-Secretary of State for Air the names of the light aeroplane clubs which are receiving a Government grant and the amount of grant received by each club during each of the last three years?

Mr. Montague: The following list gives the names of the clubs and the amount of subsidy paid for each completed club year during which they have been subsidised:

1. Hampshire, 1927, £3,020; 1928, £1,150; 1929, £2,000.
2. Lancashire, 1927, £1,220; 1928, £1,513 15*s.*; 1929, £1,655 10*s.*
3. London, 1927, £1,280; 1928, £1,844 11*s.*; 1929, £2,000.
4. Midland, 1927, £580; 1928, £855 3*s.* 6*d.*; 1929, £1,874 11*s.*
5. Newcastle-upon-Tyne, 1927, £1,150; 1928, £1,332 12*s.* 6*d.*; 1929, £1,273.
6. Yorkshire, 1927, £955; 1928, £814; 1929, £1,184 17*s.* 6*d.*
7. Bristol and Wessex, 1928, £916 17*s.* 6*d.*; 1929, £1,091 5*s.*
8. Norfolk and Norwich, 1928, £1,021 15*s.*; 1929, £788 7*s.* 6*d.*
9. Nottingham, 1928, £685 4*s.*; 1929, £557 5*s.*
10. Scottish, 1928, £1,587 2*s.* 6*d.*; 1929, £774 12*s.* 6*d.*
11. Cinque Ports, 1929, £797 12*s.* 6*d.*
12. Liverpool and District, 1929, £1,529 12*s.* 6*d.*
13. Suffolk and Eastern Counties, 1928, £500.

The club year for the clubs numbered 1 to 6 ends on July 31, for those numbered 7 to 9 on October 31, for number 10 on November 30, for number 11 on March 31, for number 12 on August 31, and for number 13 on December 31. The clubs numbered 7 to 10 have been in receipt of subsidy for two years only and those numbered 11 to 13 have completed only one year under the subsidy agreement.

The following list gives the names of the light aeroplane clubs and the number of aircraft owned by each club; in addition, there are aircraft privately owned by members in use at the clubs, but I have no information in regard to their number:

Subsidised Clubs.—London 6, Midland 3, Lancashire 4, Yorkshire 3, Newcastle-upon-Tyne 3, Hampshire 4, Bristol and Wessex 4, Norfolk and Norwich 3, Nottingham 2, Scottish 4, Suffolk and Eastern Counties 5, Cinque Ports 3, Liverpool and District 4.

Unsubsidised Clubs.—Northamptonshire 3, Southern 1, Leicestershire 1, Berks, Bucks and Oxon Nil, Household Brigade Flying Club 1, Derby and District Nil, Southport Nil, Flying Club of Ulster Nil.

Service Clubs.—Halton 2, Royal Aircraft Establishment (Farnborough) 2, Marine Aircraft Experimental Establishment (Felixstowe) Nil.

In addition, 27 aircraft are shown by the Air Ministry Register to be owned by National Flying Services, Limited.

Flying-Boats

SIR G. DALRYMPLE-WHITE asked whether, seeing that Italy has lately ordered three DO.X. flying-boats from Germany, he will say if it is the intention of the Government to secure one at least of these flying-boats for this country or to build an experimental boat on similar lines here?

Mr. Montague: The reply to the first part of the question is in the negative, but the Government experimental programme includes new types of flying-boats of approximately the same horse-power as the DO.X.

The Limitation of Armaments. Defence Services

DR. BURGIN, on December 4, called attention to the need for a limitation of naval, military, and air armaments, and for a co-ordination of defence services, and moved:—

"That, in the opinion of this House, it is desirable that His Majesty's Government should use its utmost efforts to stimulate international action for the study and eventual preparation of a treaty for the comprehensive reduction and limitation of naval, military, and air armaments, including war material as well as personnel; and that it is desirable to co-ordinate the defence forces of this country."

He said that if the motion were carried to its real conclusion it would have the effect of releasing for the social services of this country large sums which were now absorbed in unprofitable expenditure. There was nothing in the motion which referred to disarmament in the sense of depriving the country of methods of defence. He was talking in terms of reduction and limitation.

In regard to the air arm, civil and military aeroplanes were, no doubt, different in character, but the similarity between the two was sufficient to alarm the ordinary man, and alarm of that kind was far more likely to be a serious obstacle to the reduction and limitation of armaments than even a well-founded objection to the aeroplanes themselves. Something ought to be done to stimulate international action for the preparation of a treaty.

Rear-Admiral Beamish said he did not agree that a Ministry of Defence would increase the efficiency of the fighting services. If economy in armaments were essential he saw no better way of effecting it than by the abolition of the Air Force as a separate Ministry. The Navy and the Army should be the two fighting forces, each having its own flying craft under its control. This would also have the advantage of increasing efficiency. The existing Committee of Imperial Defence was a far better system than the suggested Ministry of Defence.

Mr. Lloyd George said this country had done more than any other country for disarmament. We abolished conscription; we reduced the army below the level at which it stood in 1914, and we were the first to reduce our Navy after the Washington Conference.

Sir Samuel Hoare said the growth of air armaments was the greatest of all dangers. It was a very sinister fact that year by year the expenditure upon air armaments was increasing in most countries. Since 1925 the air expenditure of Italy had risen by 28 per cent.; the air expenditure of France had risen by 92 per cent.; and that of the United States of America, a country which was obviously immune from risk of air attack, had risen by no less than 126 per cent. If civil aviation were taken into account, the expenditure of the United States in 1929 reached the colossal figure of £50,000,000, of which £30,000,000 was for the Air Forces of the Army and Navy and £20,000,000 for civil aviation. In Great Britain, in spite of our vulnerable position and the fact that our Air Force was only about half the strength of that of France, our expenditure on air armaments during the last four years had gone down by 10 per cent., so that we could claim to have a very fine record. It would be better, instead of being snowed under by a mass of technicalities on air armaments, as had been the experience of the last Government at Geneva, to proceed step by step, and endeavour to have a reduction of the air machines which were known and which were in commission within reach of the great capitals of Europe. Some agreement might be reached in that respect, and then the other aspects of the problem might be approached. Referring to proposals which were made by Signor Mussolini in 1928, Sir S. Hoare said he believed that the basis of agreement on air armaments might be found, at any rate in Europe, in parity between Great Britain, France, and Italy, and the terrible risk of competition in air armaments might be avoided. In regard to the question of a Ministry of Defence, there was not a sufficient body of common thought between the three services to justify such a step here and now. But a considerable advance had already been made towards a better centralisation and co-operation in the field of the three services. He believed the future would bring into existence not a Ministry of Defence, but something more in the nature of a War Cabinet, in which all the Departments concerned with the new implications of defence, the Foreign Office, the Dominion Office, the Board of Trade, and others, as well as the Navy, Army, and Air Force, would be represented.

Mr. Alexander, First Lord of the Admiralty, replying on behalf of the Government, said that no Government had done more than the present to stimulate international feeling in favour of disarmament. It was hoped that the Five-Power Conference to be held in London would lead to a very substantial advance in international action. It would be a very grave mistake if they entered that Conference giving the impression that it would be all right if they just got agreement among two or three of the parties. What he wanted was a general agreement among all the nations at the Conference. A great deal of the work already accomplished by the League of Nations had been of considerable value. In regard to co-ordination, there was already a beginning. There was the Committee of Imperial Defence, and the Chiefs of Staffs Sub-Committee, and as far back as June last the Cabinet appointed a Fighting Services Sub-Committee, with the Prime Minister in the chair, and the heads of the three fighting services, the Chancellor of the Exchequer, and the Secretary for Foreign Affairs. The Government welcomed the motion and hoped they were to have a sufficiently long term of office to do later, intensive work with fruitful results in disarmament, not merely here but throughout the world.

Lieut.-Commander Kenworthy suggested that civil aviation should be taken from the control of the Air Ministry and handed over to the Ministry of Transport.

The motion was agreed to.

THE AVIA B.H. 33: A successful Czechoslovak fighter biplane, which has been adopted by the Military Air Force of Czechoslovakia. It is fitted with a 500-h.p. Skoda L engine or a Bristol "Jupiter," and has a speed of about 300 km. per hour (186 m.p.h.).

THE ROYAL AIR FORCE

London Gazette, December 3, 1929.

General Duties Branch

E. M. Morris is granted a short service commn. as Pilot Officer on probation with effect from and with seniority of Nov. 6; Group Capt. J. R. W. Smyth-Pigott, D.S.O., is placed on half-pay list, Scale B. Dec. 2, 1929, to Dec. 1, 1930, inclusive: Flying Officer F. Rigby is placed on half-pay list. Scale B, Oct. 6 to 7 inclusive; Wing Commander G. F. Pretyman, D.S.O., O.B.E., is placed on retired list on account of ill-health (Nov. 30); Flight-Lieut. B. J. W. Brady, D.S.M., is placed on retired list at his own request (Nov. 28); Flying Officer E. L. Drew is transferred to Reserve, Class A (Dec. 1); Mate H. H. Gardner, R.N., Flying Officer, R.A.F., relinquishes his temp. commn. on return to Naval duty (Nov. 7).

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Pilot Officer on probation A. N. Spottiswoode is confirmed in rank (Sept. 27); Flying Officer K. Maconochie is transferred from Class A to Class C (Dec. 3).

The follg. Flying Officers relinquish their commn. on transfer to the Indian Army:—A. T. S. Studdert (Sept. 13); R. J. Stevens (Oct. 22). Flying Officer E. M. Morris relinquishes his commn. in Special Reserve on appointment to a short service commn. in Royal Air Force (Nov. 6).

Erratum.—In *Gazettes* of Dec. 6, 1927, July 24, 1928, and Aug. 6, 1929 (FLIGHT, Dec. 15, 1927, p. 857, Aug. 2, 1928, p. 679, and Aug. 15, 1929, p. 885). —*For* M. E. Morris *read* E. M. Morris.

AUXILIARY AIR FORCE

General Duties Branch

No. 600, City of London (Bomber) Squadron.

The follg. to be Pilot Officer:—G. P. Kerr (Nov. 2).

Princess Mary's Royal Air Force Nursing Service

Staff Nurse Miss G. F. H. Lloyd is promoted to the rank of Sister (Oct. 4).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties' Branch.

Group Captains.—W. F. MacN. Foster, C.B.E., D.S.O., D.F.C., to No. 1 Air Defence Group H.Q., to command, *vice* Air Commodore E. L. Gerrard, C.M.G., D.S.O., 11.11.29. M. Spicer, to H.Q., Inland Area, Stanmore, for Engineer Staff duties, on ceasing to be seconded to the Royal Australian A.F., 12.11.29.

Wing Commanders.—J. T. Babington, D.S.O., to Air Ministry (C.A.S.), on appointment as Air Representative to the League of Nations, 11.11.29. B. E. Sutton, D.S.O., O.B.E., M.C., to Special Duty List, for duty as Instructor at the Imperial Defence College, 11.11.29.

Squadron Leaders: L. H. Slatter, O.B.E., D.S.C., D.F.C., to No. 111 Sqdn., Hornchurch, 23.10.29. C. F. Gordon, O.B.E., M.C., D.F.C., to Armament and Gunnery School, Eastchurch, 8.11.29. R. G. Gardner, D.S.C., to R.A.F. Depot, Uxbridge, 4.11.29. W. S. Caster, M.C., to Experimental Section, Royal Aircraft Estab., S. Farnborough, 20.11.29. E. B. C. Betts, D.S.C., D.F.C., to H.Q., Aden Command, 16.11.29.

Flight-Lieutenants: J. H. Hagon to H.Q., Coastal Area, 14.11.29. G. S. Oddie, D.F.C., A.F.C., to Experimental Section, Royal Aircraft Estab., S. Farnborough, 24.11.29. S. P. George, to R.A.F. Depot, Uxbridge, 12.10.29. C. Crawford, to Armament & Gunnery Sch., Eastchurch, 15.10.29. A. J. E. Broomfield, D.F.C., to No. 58 Sqdn., Worthy Down, 3.11.29. G. H. Vasse, to Armament and Gunnery Sch., Eastchurch, 21.10.29. G. M. Lawson, M.C., to R.A.F. Depot, Uxbridge, 25.11.29. E. A. Hodgson, to Central Flying Sch., Wittering, 3.10.29. W. A. Duncan, to R.A.F. Depot, Uxbridge, 3.11.29. P. Murgatroyd, to Aircraft Depot, Iraq, 22.10.29. V. B. Bennett, to H.Q., R.A.F., India, 20.11.29. F. R. D. Swain, to No. 6 Sqdn., Middle East, 13.11.29. R. W. G. Lywood, to R.A.F. Depot, Middle East, 1.11.29.

Flying Officers: D. D. MacA. Eastwood, to R.A.F. Depot, Middle East, 13.11.29. R. D. Adams, to R.A.F. Depot, Uxbridge, 12.10.29. F. D. Biggs, to No. 207 Sqdn., Bircham Newton, 18.11.29. V. S. Bowling, to No. 501 Sqdn., Filton, 9.11.29. P. G. Lucas, to No. 41 Sqdn., Northolt, 12.11.29. A. W. H. Nelson, to Elect. and Wireless Sch., Cranwell, 1.11.29. J. Parsons, to No. 5 Flying Training Sch., Sealand, 1.11.29. E. M. Thompson, to Station H.Q., Donibristle, 1.11.29. W. F. Bryanton, to R.A.F. Depot, Uxbridge, 21.10.29. W. R. J. Spittle, to R.A.F. Depot, Uxbridge, 12.10.29. C. K. J. Coggle, to No. 3 Sqdn., Upavon, 15.11.29.

Pilot Officers: R. A. Sprague, to No. 6 Sqdn., Middle East, 13.11.29. F. S. Barron, to No. 47 Sqdn., Middle East, 6.11.29.

Stores Branch

Flight-Lieutenants: K. D. G. Collier, to Station H.Q., Mount Batten, 16.12.29. N. Robertson, to No. 100 Sqdn., Bicester, 25.11.29. G. C. Wilson, to R.A.F. Base, Gosport, 6.12.29.

Flying Officers: A. J. Redman, D.F.C., to No. 602 Sqdn., Glasgow, 14.11.29. C. S. Whellock, to No. 2 Stores (Ammunition) Depot, Altrincham, 6.11.29. E. A. Burridge, to R.A.F. Depot, Middle East, 5.11.29. C. Thripp, H. A. Wrigley and J. S. French, to R.A.F. Depot, Uxbridge, 2.12.29.

Accountant Branch

Flight-Lieutenant B. G. Drake, to H.Q., Aden Command, 16.11.29.

Flying Officer H. D. Conner, to Station H.Q., Northolt, 23.10.29.

Medical Branch

Squadron-Leader T. Montgomery, M.B., D.P.H., B.A., to R.A.F. Combined Hospital, Aden, 16.11.29.

Flight-Lieutenants: (Hon. Sqdn.-Ldr.) J. W. H. Steil, M.B., to Station H.Q., Kenley, on appointment to a temp. commn., 30.10.29. C. A. Lindup, to Station H.Q., Upavon, 18.11.29. E. P. Carroll, to No. 6 Sqdn., Middle East, 26.10.29. R. W. White, to No. 20 Sqdn., India, 8.10.29. R. L. C. Fisher, M.B., to No. 31 Sqdn., India, 8.10.29. A. A. Townsend, M.B., to Aircraft Park, India, 8.10.29. J. A. Quin, M.D., B.A., to No. 25 Sqdn., Hawkinge, 13.11.29. R. G. J. Charlesworth (Dental), to Marine Aircraft Experimental Estab., Felixstowe, 26.11.29. R. E. Edwards (Dental), to R.A.F. Depot, Uxbridge, on appointment to a temp. commn., 8.11.29.

Flying Officer C. M. Leckie (Dental), to R.A.F. Depot, Uxbridge, on appointment to a temp. commn., 18.10.29.

Chaplain's Branch

Rev. J. Lavin, to R.A.F. Depot, Uxbridge, on appointment to a short service commn., 20.11.29.

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty:—

Lieutenants, R.N., Flying Officers, R.A.F.: E. J. E. Burt and G. M. Pares, to *Victory* (Nov. 6); S. T. Morgan, to *Argus* (Dec. 9); R. H. S. Roundell and N. S. Luard, to Greenwich (Dec. 12).

◈ ◈

Accountant Officers, Royal Air Force

THE Air Ministry announces that an examination will be held in the latter part of March, 1930, under the scheme inaugurated in 1924 for the entry into the Accountant Branch of the Royal Air Force of qualified and experienced civil accountants. About six vacancies are likely to be available. The age limits are 22 to 26.

The competition will be held in London by the Civil Service Commissioners, and will include (1) an examination in book-keeping and accountancy (excluding partnership and executorship accounts), the standard being that of the final examinations of the Institute of Chartered Accountants and the Society of Incorporated Accountants and Auditors; (2) an examination in English and general knowledge (essay, précis and questions to test knowledge of matters of general interest); and (3) an interview before a selection board, at which stress will be laid on accounting experience and special weight given to the type of experience provided by articled service.

The emoluments of an Accountant Officer consist on the one hand of pay, and on the other of accommodation, fuel, light, rations and personal attendance provided in kind. When the latter are not available cash allowances are granted in lieu. The total of the pay and cash allowances of accountant officers range at present rates from about £400 a year for an officer on first entry to £1,135 a year for a married officer in the highest rank.

The Accountant Branch provides a permanent career. It is not, of course, possible to pledge the future, but so far as present foresight can show, the Branch will be subject to no sudden changes affecting adversely the fortunes of its officers. The Air Force is at present a growing service and the duties thrown on the Accountant Branch are such as will, so far as can be foreseen, always be required.

Officers enter the Branch with the rank of Pilot Officer and on probation. After twelve months' satisfactory service they are confirmed in their commission and promoted to Flying Officer. Thereafter, promotion is by selection. The next ranks are Flight Lieutenant and Squadron Leader, and it is contemplated that officers who give satisfactory service should be promoted at least up to the latter rank, while a reasonable proportion would be able to expect promotion to the higher rank of Wing Commander and some to the rank of Group Captain. It must be understood that promotion depends on requirements and requirements on future circumstances, but the policy of the Air Ministry is directed to ensuring to Accountant Officers a career not inferior to that indicated above.

The length of the career provided depends on the rank attained. The compulsory retiring ages are, for Squadron Leaders 53, for Wing Commanders 57, and for Group Captains 60; any officers not attaining the rank of Squadron Leader would be retired at the age of 50.

Application should be made to the Secretary, Air Ministry (S.7), Kingsway, London, W.C.2, for the regulations and for application forms. Completed application forms should reach the Air Ministry by February 1 next, or at latest by February 15.

◈ ◈

Royal Air Force Club and Christmas

THE Royal Air Force Club will be closed from 2.30 p.m. on Friday, December 27, until 12.30 p.m. on Saturday, December 28 (for the purpose of holding the annual staff dance), except in so far as affects bedroom accommodation (with breakfasts only) to residents and members who have engaged bedrooms prior to noon on December 27. The club will remain open during the Christmas Holidays.

10th Annual Reunion Dinner of No. 3 Squadron, R.F.C. and No. 3 (Fighter) Squadron, R.A.F.

THE above dinner was held on December 6 last, at the Hotel Cecil. Air Chief Marshal Sir John Maitland Salmond, K.C.B., C.M.G., C.V.O., D.S.O., A.D.C., was in the chair, and Air Vice-Marshal Charles A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C., was Guest of Honour of the evening. Thirty-nine past and present members were at the dinner. It was a very rough night—meteorologically, of course—and this probably accounts for there being eleven empty seats.

Speeches were made by Air Chief Marshal Sir John Maitland Salmond, K.C.B., C.M.G., C.V.O., D.S.O., A.D.C., Air Vice-Marshal Charles A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C., and Sqdn.-Ldr. E. Digby-Johnson, A.F.C., the present Commanding Officer of the Squadron.

An impromptu concert was held after dinner, which went on till midnight, when the party reluctantly broke up.

The Royal Aeronautical Society Hull and Leeds Branch

THE first meeting of the 1929-30 Session of the above society was held in the Aviation Club, Brough, on Friday, December 6, about 120 members and friends being present. The chair was taken by Mr. E. Hudson, Secretary and Director of the Blackburn Aeroplane and Motor Co., Ltd., and a lecture on "The Testing of Flying Boats and Seaplanes" was delivered by Mr. L. P. Coombes, B.Sc., A.C.G.I., of the Marine Aircraft Experimental Establishment, Felixstowe.

Mr. Coombes gave an account of the various standard tests applied to a flying boat or seaplane after it had been delivered by the contractor to the Government station at Felixstowe. These tests include weight and centre of gravity determination, time and distance to take off, stability tests, and air performance trials. The methods of testing and apparatus employed were very clearly described, and in addition to standard tests many special tests, such as the determination of static thrust, and research work on the efficiency of water rudders, were explained. The lecture was illustrated by some very interesting lantern slides. A discussion followed the lecture, and many questions of technical interest were put to the lecturer by members.

The next meeting of the Branch will be held in the Hull University College on Friday, January 3, 1930, when Mr. V. J. Johnston, Wh.Ex., A.F.R.Ae.S., Assistant Designer of Messrs. Boulton and Paul, Ltd., Norwich, will deliver a lecture on "Metal Construction of Aircraft."

AIR POST STAMPS

By DOUGLAS ARMSTRONG

(Editor of " The Stamp Collector ")

Empire Air Stamps

WHILST Great Britain lags behind, the self-governing Dominions are showing themselves alive to the practical and publicity value of distinctive stamps in connection with their air post services. Canada and Australia have already provided special issues for the newest branch of the post office and on August 26 last South Africa followed suit with 4*d.* and 6*d.* denominations for use over the re-opened Capetown-Johannesburg-Durban air line. These stamps have been locally produced by the Government Printer at Pretoria in a design representing an aeroplane in flight over Table Mountain, the 4*d.* printed in green and the 1*s.* in a bright orange colour. Artistically considered they compare unfavourably with either the Australian or Canadian air stamps, but are an improvement upon the former South African series of 1925, which, by the way, is becoming harder to get all the time and for this reason is much undervalued in the latest stamp catalogues. Collectors of " first flight " covers have seven stages to acquire, viz., Capetown to Port Elizabeth, East London, Germiston, Bloemfontein, Durban, Johannesburg and Lorenzo Marques and the same for the first southward flights on August 29 to catch the return mail to Europe. In addition one or more letters despatched by the first mail from Great Britain on August 9 for transmission from Capetown by air will be needed to make a collection thoroughly representative. About 25,000 items in all were carried upon the inaugural flights throughout the Union.

The Indian air mail service which up to now has been conducted without the aid of separate air stamps was to be brought into line on November 1 by the introduction of a distinctive set of five values, designs for which were obtained in open competition by the post office department some twelve months ago. For the time being these will only be available at certain of the more important post offices. Meanwhile ordinary current postage stamps will continue to be accepted in pre-payment of air post fees at such offices as have not the new air post issue on sale.

Latest from Uruguay

The seventh successive series of air post stamps to emanate from the Latin-American Republic of Uruguay made its *debut* on August 12, 1929, in a striking and finely-engraved design representing the legendary winged horse Pegasus against a background of the constellation that bears his name. There are twelve stamps in the series, ranging in value from 8 centesimos to 4P50 c., corresponding to the special tariffs for both the South American and Trans-Atlantic air services. Simultaneously a 4 centesimos air stamp (not included in the new series) appeared unexpectedly in the former " Seagull " type, now obsolete.

Soaring Values

In the opinion of a leading stamp market authority air post stamps offer one of the finest investments in the philatelic world today. This is borne out by further sensational advances in quotations for the scarcer varieties in the latest edition of Stanley Gibbon's Priced Catalogue of the world's postage stamps. The " Hawker " stamp of Newfoundland, advanced from £100 to £150 unused, is still much undervalued. Only the other day, we hear of £225 being refused for a fine specimen. The " De Pinedo " issue, previously unpriced in mint state, is now quoted at £85, and will undoubtedly go higher. The official Colombian air stamp of 1919 has jumped from £12 to £25, and has sold for £40. The 24 cents U.S.A. " error," with *inverted centre*, has put on £35 since last year, being now listed at £185, whilst the Russian 15 kopecs on 1 Rouble (1924), with inverted surcharge, has risen by £5 from £35 to £40. Many other instances of less highly valued varieties might be cited in support of the argument that air stamps are still rising.

Japanese Aero Issue

Another notable new issue of air post stamps emanates from Japan, where a set of four official aero stamps was taken into service on October 6, handsomely engraved and recess printed by the Government Printing Bureau, Tokio, in a characteristic design of a postal 'plane in flight over Lake Hakone, with a distant view of Fujiyama in the background. The values, 8½ sen, brown, and 18 sen, blue, are intended for the inland air service, whilst those of 16½ sen, yellow-green, and 33 sen, grey, defray air post fees on the Japan-Corea-Manchurian air line.

SIDEWINDS

Christmas Gifts

WITH the approach of Christmas those with air-minded friends cannot do better than consider such things as a pair of goggles like the Luxor made by Meyrowitz, of 1A, Old Bond Street, while for the fairer sex Gieves of 21, Old Bond Street, have a very attractive range of brooches in the form of the R.A.F. badge.

A Motorist's Log Book

THE Anglo-American Oil Co. are supplying a useful little book, free on request, to motorists. It provides space for a complete record to be kept of attention given to the car, much on the same lines as is done with aeroplane engines. This, and the general information it includes, should be very useful to those who are careful of their cars.

Mixed Grill

IN last week's issue a curious mishap occurred in our article dealing with the Gloster S.S.8 Single-seater Fighter. On p. 1273 certain dimensions were given, as well as a figure for total loaded weight, accompanied by the sentence: " Engine power more than 1250." These figures referred to the Gloster VI Schneider machine, and *not* to the S.S.8. How the figures for the two machines came to be mixed up is still something of a mystery, as the communications from the Gloster Aircraft Company stated quite clearly that the figures related to the Schneider machine. We apologise for the mistake for which we ourselves must take the entire blame.

" Ayjaycob "

IN a paragraph published in our issue for November 29 concerning the change of address of Alan Cobham Aviation, Ltd., the cable address was, through a printer's error, wrongly given. This should be " Ayjaycob."

* * * *

PUBLICATIONS RECEIVED

Air Ministry Meteorological Office, Professional Note No. 52. —Bumpiness on the Cairo-Basra Air Route. By J. Durward, M.A. H.M. Stationery Office, Kingsway, London, W.C.2. Price 3*d.* net.

Transport Aviation—A Handbook of the Aviation Business. By Archibald Black. Simmons-Boardman Publishing Co., 30, Church Street, New York. London: Simpkin, Marshall, Ltd., Stationers' Hall Court, E.C. Price $5.

* * * *

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* * * *

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations:* Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

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